Rubber Journal and International Plastics

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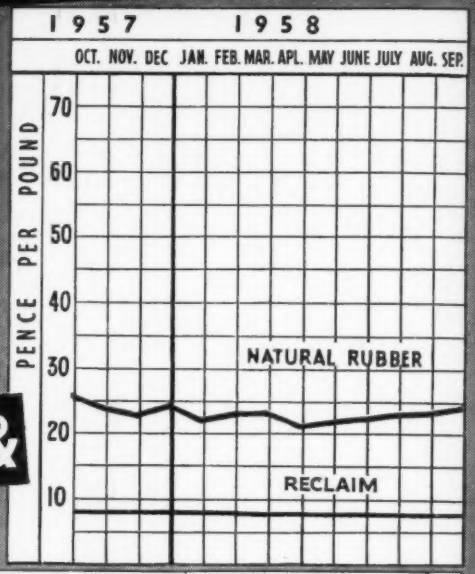

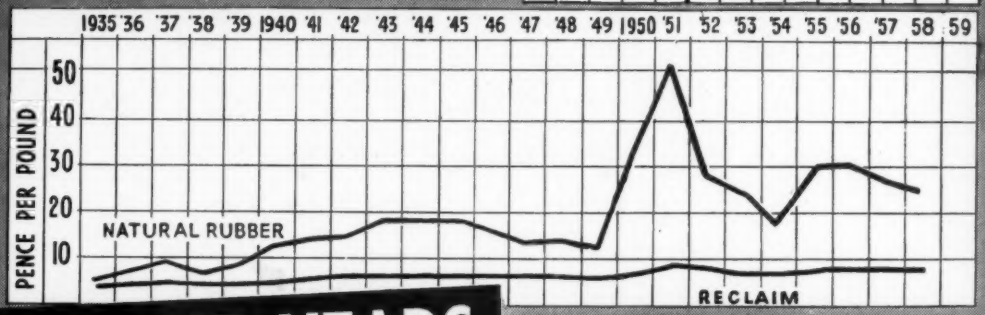

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IN ITS 75th YEAR

April 11 1959

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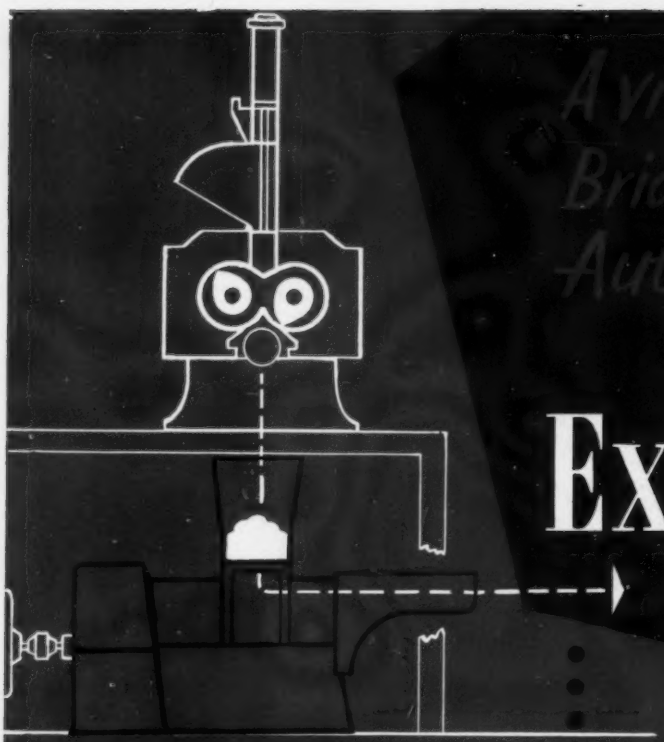

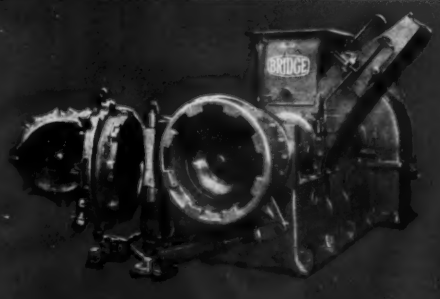

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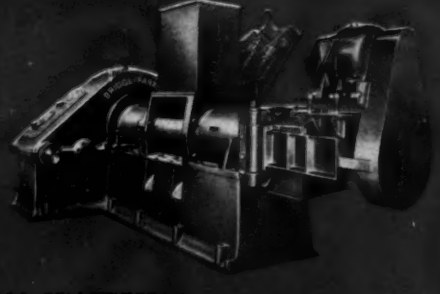

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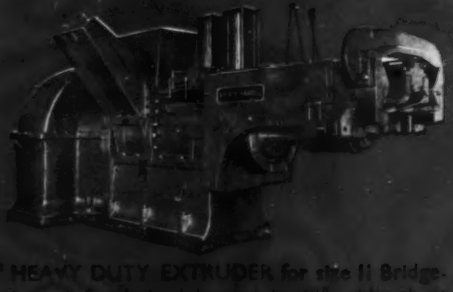

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NOTES of the WEEK

Not So Bad

THE major budget measures can reasonably be said to be a good thing in themselves. The reductions in income tax and purchase tax affect virtually everybody in the country and the effect should be to aid and encourage expansion and efficiency. The ending of the 30% purchase tax on commercial vehicle chassis is certainly welcome and the removal of this 'barrier' should result in higher sales with consequent benefit to the rubber industry and, to a lesser but increasing extent, to the plastics industry. The encouragement to industry generally given by the reintroduction of investment allowances, while being possibly somewhat controversial, does mean, at present rates of income and profits tax, a subsidy of 10% or so on investment in new equipment, even though, from the point of view of the industrialist acquiring new machinery, the benefits are long-term rather than immediate. Also to be taken into account are the income tax reductions introduced by the Chancellor which will have the effect of increasing the proportion of profits available to companies for investment. Another feature of the Budget is that the levels of remuneration paid to directors of director-controlled companies and which are allowable for profits tax purposes are to be raised. The change concerns the alternative limits calculated by the number of directors, other than whole-time service directors, which are to be increased. *The Financial Times* quotes Sir Miles Thomas, chairman of the British Productivity Council and of Monsanto, as describing Mr. Heathcoat Amory's Budget as 'an expansionist budget' and one whose keynote seems to be 'to facilitate a rise in standards of living by promoting better value in consumer goods bought.' Above all, it is clear that the Chancellor has faced up to the over-riding necessity to encourage expansion and to give a boost to productive investment, even though certain risks are inevitably involved. By and large, the Chancellor's concessions somewhat exceed anticipations and a further optimistic note is lent to them by the fact that the Budget is designed to have an increasing effect on the economy as time goes on.

Paper Sizes

THE Plastics Institute has adopted international paper sizes for its stationery. This step follows the recommendation last year by the British Standards Institution that industrial and commercial organizations and others in this country should make the change. The undoubtedly considerable domestic economies that must follow paper size standardization are of less import than longer-term considerations, for the importance to Britain of foreign trade makes it increasingly necessary that our practices should, where possible, be in line with those of other countries. The two best-known of the international paper sizes are A4 measuring 210 mm. by 297 mm. (approximately 8¼in. × 11¾in.) which falls conveniently between our conventional 'foolscap' and 'quarto' letter paper—both of which it replaces, and A5 which is exactly half the size of A4. These and related sizes in the 'A' series were accepted by many countries before the last war and are now standard in more than 25. The three standard sizes, coded A, B and C, compare with the extraordinary complexity of English paper sizes and the even more confused range of over 50 different envelope sizes which bear little or no relation each to the other. On this, almost anything would be any improvement.

Puzzle Post

IN future, thanks to Mr Marples, there is to be more liveliness over the wires from the GPO 'phone girls who have been asked to respond in sprightlier fashion to subscribers. Another move by the GPO in the public relations field is the holding of a series of small 'exhibitions' at local shops and stores throughout the country. These will show people how they can themselves help to speed up various sides of post office work, especially the delivery of letters and parcels. The right and the wrong way of addressing envelopes and labels is demonstrated, and some of the actual and awful examples put on view: illegible outsize, undersize and spider-writing; blots; erasures; crossings-out and leavings-in. But it is not only a question of bad handwriting. There is also the intentional befogger who draws, for instance, picture-puzzles on his envelopes, or perpetrates a combination of signs and languages. One place-name that foxed the officials for a time was 'Arijaba'—which looked like somewhere in the Middle East, though no gazetteer gave it. So over to the chief solutionist, who presently emerged with: 'Yes, of course . . . Arijaba—*Harwich Harbour*." And there the letter was duly delivered. Amusing. But perhaps not so funny for the sorters who, as it is pointed out at the exhibitions, have to handle some 26m. letters every day.

NEWS *Briefs*

INDONESIAN RUBBER BAN — POLYMER STRIKE
ITALIAN SR—CEYLON/CHINA EXCHANGE TALKS
TYRE PLANT FOR FRANCE—MALAYAN EXPORTS

●**United States**—Plans for the construction of a plant to produce ethylene oxide and derivatives in Italy were announced recently by Morse G. Dial, chairman of the board of Union Carbide Corporation. The unit will contribute to the expanding activities of SpA Celene, a jointly owned Italian company formed in 1957 by Union Carbide Corporation and Societa Edison of Milan, to produce chemicals and plastics. The new installation will be located adjacent to Celene's polythene unit near Prioli, Sicily. Plans call for annual capacity of 12,000 metric tons with production scheduled to commence in mid-1960.

●**Ceylon**—Talks on the current year's rice/rubber barter deals between Ceylon and China continue. They have been going on for some weeks and are expected to pass from official to ministerial level with the arrival shortly of the Chinese Vice-Minister for Foreign Trade. One of the main snags that has developed during the negotiations is a Chinese demand for greater supplies of Ceylon rubber this year than the 30,000 tons provided for in the previous barter deal—a demand to which Ceylon apparently is hesitant to commit herself.

●**Indonesia** — Methods of increasing Indonesian rubber production were discussed at a meeting in Djakarta recently between Dr Subandrio, the Indonesian Foreign Minister, and Mr Nikolai Firubin, Soviet Deputy Foreign Minister. Announcing this, Dr Subandrio said it was hoped that an Indonesian trade mission would go to Moscow soon.

●**United States** — United States Rubber Co. has announced it will close its latex plant in Manchester, New Hampshire, to consolidate production in fewer plants nearer to customers and sources of raw materials. Approximately 190 employees will be affected by the closing which will be accomplished gradually over a period of about five months.

●**Malaya**—Mr A. W. Goode, chairman of the Malayan Rubber Producers Council, said last weekend the local industry was confident it could meet competition from synthetic rubber. But, he added, smallholders and estate owners would have to replant with new high-bearing stock as quickly as they could. It was important that the natural rubber industry should also keep up with scientific research. Most industries faced competition 'and in our case, time is not on our side,' Mr Goode said.

●**Indonesia**—The Indonesian Government has no intention of lifting the ban on the export of South Sumatran rubber slabs to Malaya. This was stated recently by Mr Sastrowardojo Surjono, the chief information officer of the Indonesian Consulate in Singapore. He was commenting on reports that rubber producers in South Sumatra wanted to resume direct exports of rubber slabs to Malaya. He said the ban placed in effect five years ago was aimed at helping re-milling factories in Palembang.

●**Malaya**—Rubber exports in March amounted to 100,482 tons, according to preliminary figures issued by the Chief Statistician in Singapore on Monday. This compares with 93,396 tons exported in February.

●**United States**—Goodyear Tire and Rubber Co. stock holders at the annual meeting, approved a proposal to increase the authorized common shares to 40 million from the present 15 million shares. The action also changes the shares from 5 dollars par to no-par. At the end of 1958 the company had 10,815,057 shares outstanding. In proposing the increase the company had stated there were no present intentions of issuing additional shares.

●**Canada**—The Polymer Corporation continues to be strike-bound. The Oil, Chemical and Atomic Workers' Union called the men out—about 1,600—from the Sarnia, Ontario, plant more than a month ago. Industrial sources say that the union's conditions are hard—despite the fact that the company is engaged in a sharp competitive fight to maintain its position in world markets. Both sides are sticking to their positions, and digging in for a drawn-out battle. The union met Polymer's last-ditch proposal with a reversion to the original union demand for increases totalling $1 per hour. The company's offer, an official said, would have put its rates at the top of the chemical industry in Canada.

●**United States**—Construction of a 7,000,000 dollar tyre manufacturing plant in France by Goodyear Tire and Rubber Co. will begin as soon as plans —which are well under way —can be completed, Mr E. J. Thomas, the chairman, has announced. Mr Thomas said Goodyear was now studying site locations in France and a decision was expected shortly. He said that engineering work was already well under way. The French plant would be the first such facility in that country to be built and owned by an American tyre maker and would bring to 29 the number of overseas plants where Goodyear tyres were manufactured.

●**Italy**—The Italian National Hydrocarbon Corporation (ENI) will shortly send 5,000 tons of synthetic rubber to Mainland China under a contract signed with the China National Import-Export Corporation, an ENI spokesman said on Tuesday.

'Indade, 'tis a quare auld wet he is, with himself saying me poor wee Bismark gives him g rand idea!'—434

Plastics at Work

SOME PROPERTIES OF RESIN BONDED GLASS FIBRE

By DAVID ALEXANDER

TO date *Plastics at Work* has principally dealt with the use of various thermoplastic materials such as polythene, PVC and high density polythenes and their practical applications in various industries. Already a substantial and growing market has developed as chemists and engineers have become more acquainted with the properties of these thermoplastics.

The greatest difficulty that has to some degree limited their use has been that of mechanical strength and temperature limitation. For example, the normal polythene and PVC can only be used up to approximately 60°C., and therefore, to the plastics engineer any temperature increase possible is of great importance. With the commercial availability of Zeigler, Phillips and other high density polythenes the temperature limitation figure has now gone up to 80°C., a considerable step forward but nevertheless a very low figure bearing in mind the operating temperatures that exist in chemical plants, plating departments and other related applications where corrosion is a severe problem. There is considerable hope that the temperature limitation of the thermoplastics will again be raised within the forseeable future and perhaps such materials as the polycarbonates will provide one of the main means of achieving this. Generally speaking, however, the problem of mechanical strength will still limit the number of applications for thermoplastics.

With these limiting factors in mind, chemists and engineers are tending to turn towards resin-bonded glass fibre materials, as complementary to thermoplastics, which can be used to construct plant with very much greater mechanical strength and which will operate at very much higher temperatures. Almost inevitably the cost of resin-bonded materials has been high, but in the last year to 18 months there has been a considerable reduction in these costings which make it a practical proposition to consider their use in many more applications than hitherto. Reinforced plastics are now being used in the construction of chemical tanks, ducting and pressure pipeline systems, and are proving a very great asset to those worried by corrosion. These materials are also used in the construction of boat hulls and in the manufacture of roof lights. They are also, of course, being used to some degree in the manufacture of car bodies, although in this particular field it is only in certain sections of the industry that reinforced plastics can be considered. At this stage it would seem that mechanically it is not practicable to set up equipment for bulk production of car bodies but where there is a limited market for such things as specialized production models, then glass fibre can be considered. General Motors Corporation of America have, in fact, used reinforced plastics on a production basis in the construction of their Chevrolet 'Corvette.' In the case of the Citroen DS 19 and British cars such as the Berkeley, Jensen, and Turner, some of the parts are being made from this material.

In view of the variety of uses to which these reinforced plastics can be put, it may be useful to examine some of the properties, particularly of polyester and epoxy resin-bonded glass fibre, which are used to a greater extent than other materials in the construction of corrosion resistant plant.

Generally speaking, polyester resin-bonded glass fibre is the more commonly used, mainly because of price, but it does not have the range of properties that epoxy resin-bonded glass fibre contains. For the purposes of this report there is need, therefore, to examine principally the epoxy resins in order to indicate the maximum possibilities for reinforced plastics, bearing in mind that this information, to a lesser degree, applies to polyester resins which, in many circumstances, are sufficiently good in their properties to be used in preference to the higher-priced epoxies.

Hydraulic Bursting Strength

Independent tests carried out on three 3ft. lengths of 6in. pipe which were submitted to an increasing hydraulic pressure until the pipe fractured, showed the following results. Bursting pressure (a) 1,800 psi, (b) 1,300 psi. (c) 1,200 psi, giving a mean average of 1,430 psi. The differences are in part due to possible fractional wall differences resulting from variations in the amount of resin bonded.

Tensile Strength

In accordance with BS 2782, method 301C, some test pieces were cut out with the major axis parallel to the axis of the pipe. Some six pieces were given tests with a maximum figure of 3,000 psi and a minimum figure of 1,980 psi, the overall average being approximately 2,500 psi.

Cross Breaking Strength

Tests were carried out in accordance with BS 2782, method 304B, when some 12 rectangular pieces were cut out with the major axis parallel to the axis of the pipe. These pieces were 3½in. x ½in. and half of them were tested with the breaking force applied to the concave face of the test piece and half with the breaking force applied to the convex face. The results showed on the first six pieces, which were submitted to a force applied on the concave face, an average figure of 9,450 psi, and in the case of the convex face on the six pieces they showed an average figure of 7,650 psi.

Shear Strength

This test was carried out in accordance with BS 2782 method 305B. Again eight test pieces 3½in. x ½in. were cut out with the major axis parallel to the axis of the pipe. These pieces were sheared by a 2½in. diameter piston travelling in a cylinder. Again two types of test were made, the first with the piston being against the concave face and in the second with the piston being against the convex face. The results were that in the first test an average figure of 7,300 psi was reached and in the second test a figure of 7,500 psi was reached.

Impact Strength

This test was carried out in accordance with BS 2782, method 306A. The test was conducted on pieces 0.500in. wide and 2.5in. long with a V-shaped notch 45° angle 0.1in. deep cut in the centre of one of the long edges. These pieces were subject to an impact velocity of 8ft. per second using a 2ft./lb. testing machine and gave an average reading of 4.00ft./lb. per in. thickness.

Heat Resistance

This test was carried out in accordance with ASTM D648/45T, a tentative method for measuring heat distortion of plastics. The heat distortion temperature is the temperature

at which a distortion of 0.010in. is recorded in a bar of test material loaded to give a specified fibre stress. The results were as follows:

Length 5in. Width ½in. Depth ½in. Span width 4in. Loaded at 1.375lb., fibre stress 264 psi. This gave a heat distortion temperature of 145°C. at 264 psi.

In the field of electrical strength some very interesting figures are available and as shown below the failure level is very high.

Electrical Strength

Tested in accordance with BS 2782 methods 201D and 201F at 20°C. and 90°C.

Sample 1.	0.127 in. thick	½ kv./sq. in. failed at 38 kv.	Trial specimen.
Sample 2.	0.119 in. thick	Voltage applied, from 19 kv. to 48 kv. for 20 secs. Failed at 50 kv.	400 v./mil. elec. strength.
Sample 3.	0.131 in. thick	Voltage applied as in sample 2. Failed at 48 kv.	351 v./mil. elec. strength.

The above tests were carried out at 20°C.

Similar series of tests were carried out at 90°C. with the following results:

Sample 1.	0.121 in. thick	An applied voltage of ½ kv./sec. Failed at 44 kv.	Trial specimen.
Sample 2.	0.122 in. thick	Withstood 22-24 kv. applied v. for 20 secs. Failed at 26 kv.	197 v./mil. elec. strength.
Sample 3.	0.126 in. thick	Withstood from 22-44 kv. applied through the range for 20 sec. Failed at 46 kv.	350 v./mil. elec. strength.

Apart from the above properties, electrical and mechanical, the resistance of epoxy resin-bonded glass fibre to attack by chemicals is good and various tests have been carried out to show the chemical resistance. Below is given a table showing some of the resistance range, two types of test being carried out. The first over a period of one month at normal temperature and the second in more severe conditions of seven days at 130°F.

Chemical Resistance

Sample pieces were immersed under various chemicals with the following results:

Chemical	*One Month at Normal Temp.*	*Seven days at 130°F.*
Hydrochloric acid 1 : 1 ..	Colour changed to blue on cut edges.	Colour changed to blue on cut edges.
Hydrochloric acid concentrated.	Colour changed to blue on cut edges.	Only faint blue colour change.
Nitric acid 1 : 1	Very slight attack.	Severe attack.
Sulphuric acid 1 : 1 ..	Blue coloration.	Blue coloration.
Acetic acid 1 : 1	,, ,,	,, ,,
5% caustic soda	Unaffected.	Unaffected.
5% sodium carbonate ..	,,	,,
Saturated brine	,,	,,
Moist chlorine	Bleached superficially.	,,
Petrol	Unaffected.	,,
Trichloroethylene	,,	,,
Industrial methylated spirit	,,	,,
Amyl acetate	,,	,,

Although information is not perhaps so readily available in the UK as yet, there is some very interesting data about the performances of reinforced plastic pipe from the US where production began in 1951. One particularly interesting example is where 800,000ft. of epoxy pipe has been put into service and has a record of three years' operation without a single field failure, even though it is operating at high pressures where steel and ordinary plastic-coated steel, stainless steel and other materials have lasted often as little as three months. In this particular instance records show that the original pipe is still in use as long as five years. In this instance the pipe made earlier from polyester resins had failures which, however, have been eliminated by use of epoxy. Test sections of these pipes were subjected to strength tests and showed a change of less than 3%. Hoop structures had burst range from 20,000 to 42,000 psi dependent on the glass structure and yield structures from between 13,000 to 20,000 psi. Reinforced epoxy strength is 6 to 10 times that of thermoplastics and at all stress levels can handle surge loads which are dangerous with polythene and PVC. Operating temperatures of as high as 220°F. are used and in field trials epoxy pipe has been in service of up to 300°F. with no failures.

As can be appreciated the above figures are exceptionally interesting and even allowing for certain commercial bias in obtaining these figures, there is no doubt that epoxy resin-bonded materials will have a very real value to chemical engineers and others concerned with corrosion problems.

Price Structures

It is not easy to examine price structures accurately as the techniques of construction and production and various other factors vary from company to company. As a matter of interest, certain figures were obtained for polyester glass fibre tanks. These figures show the different prices that can result from different techniques. In both cases the tanks are of identical size and these prices will allow for comparison with normal thermoplastics and producted steel tanks.

Costing 1 (polyester glass fibre tanks):
- (*a*) 3 ft. x 2 ft. x 2 ft. 6 in... £34 10s.
- (*b*) 2 ft. x 2 ft. x 3 ft. .. £27 15s.
- (*c*) 4 ft. x 2 ft. x 2 ft. 6 in... £41 17s.

Costing 2:
- (*a*) 3 ft. x 2 ft. x 2 ft. 6 in... £25 10s.
- (*b*) 2 ft. x 2 ft. x 3 ft. .. £22 5s.
- (*c*) 4 ft. x 2 ft. x 2 ft. 6 in... £30 10s.

If further test costings are compared a considerable variation can be found in quotations for identical items and as yet there seem to be few companies that have standardized techniques which allow for similar quotations as is the case in thermoplastics. From information available it seems that there are a number of techniques used and various schools of thought as to the amount of resin used. In some cases a certain overcaution would seem to be present and the converse in some cases. There are, of course, weaknesses, particularly in the polyester resin products where, as a result of chipping of the surface resin, a certain capillary action can take place inside the laminate which could cause a break up of the structure. In the case of epoxy resin pipe this danger is not so great and in fact it is claimed that this pipe can be transported unwrapped as it cannot be damaged through fracture on the ground. Another feature of value is the light weight of reinforced pipe. For example, two men can handle a 15ft. length of 24in. diameter pipe with ease. There are problems connected with the development of fittings and means of joining glass fibre but it is not intended to go into these techniques.

Conclusion

To summarize, it would seem reasonable to say that resin-bonded glass fibre materials, particularly where epoxy resin is used, are worthy of serious consideration and examination by plant engineers and chemists as it is obvious that with the very great mechanical strength, corrosion resistance and temperature resistance that these materials will offer, a further means of reducing the very large amount of expenditure that at present takes place merely in replacing frequently the plant and pipeline systems, etc., which are continuously corroding.

English Fillers in Butyl Rubber

FOR GENERAL AND ELECTRICAL APPLICATIONS

THE results of a comparison of some British hard, soft and calcined clays and American materials in general purpose and insulating compounds are described in Report No. 2 issued recently by Esso Petroleum Co. Ltd., Chemicals Department. The evaluation of certain representative white fillers was undertaken by the Enjay Laboratories, New Jersey.

For general purpose applications, such as general mechanicals, the report, by A. G. Strong, states it has been found that optimum properties are obtained by using a mixture of fillers. As a simplified compounding system is required for an initial filler comparison, formulations were designed to accentuate the comparative properties conferred by the filler. High molecular weight butyl, which is more difficult to extrude smoothly, was selected and processing aids were omitted to eliminate processing variables.

Hot mixing and heat treatment have now become established processes for butyl compounding and therefore the response of the filler to these treatments as well as conventional processing has been studied.

The properties of the unvulcanized compounds have been determined by Mooney Viscosity, William's Plastimeter and Garvey Die Rating tests. Tensile strength, elongation at break, modulus at 300% and Shore hardness tests were made on the vulcanized rubber.

Selected fillers have been evaluated in a quinoid cure system recommended for electrical insulation. In addition to the physical properties, the dielectric strength, insulation resistance, dielectric constant, power factor and water absorption have been measured and electrical stability has been assessed by repeating these tests after the vulcanizate has been immersed in water for increasing periods of time.

Clay Response

In general, the report continues, hard clays respond vigorously to hot mixing causing the butyl polymer to depolymerize. This is evident by a marked decrease in the viscosity of the stock and vulcanization is not possible. When a promoter such as Elastopar is present, depolymerization does not occur and the modulus and other physical properties are enhanced in a similar way to the butyl-carbon black systems described in the literature. Because of their differing chemical nature, soft clays and calcined clays respond only moderately to promoted heat treatment, and the slight improvement in physical characteristics generally results from the better dispersion obtained from hot mixing.

Results

The results show that Spestone and Speswhite, both hard clays, resemble Suprex in physical properties and respond similarly to hot mixing and heat treatment. Speswhite is slightly less reactive than Spestone, possesses poorer electrical stability and exhibits higher moisture absorption. The high value of dielectric strength of the Speswhite compound may have some significance.

Stockalite has the tensile strength of a hard clay but responds only moderately to promoted heat treatment. However, it does not depolymerize on hot mixing as would be expected. In further contradiction to the general classification 73D soft clay depolymerizes on heat treatment.

ECR Clay appears to be equivalent to Whitetex, although its electrical stability and moisure absorption are inferior to Whitetex. The ECR Clays confer a higher viscosity to the unvulcanized compound which contributes towards better extrusion and a faster extrusion rate.

It is concluded that the English hard and calcined clays can replace the American equivalents in butyl formulations without unduly affecting the compound properties.

Seven tables show formulations and mixing techniques; physical properties, comparison data and electrical properties. Acknowledgments are made to English China Clays Ltd. for the supply of clays.

Launching Rubber Liferafts

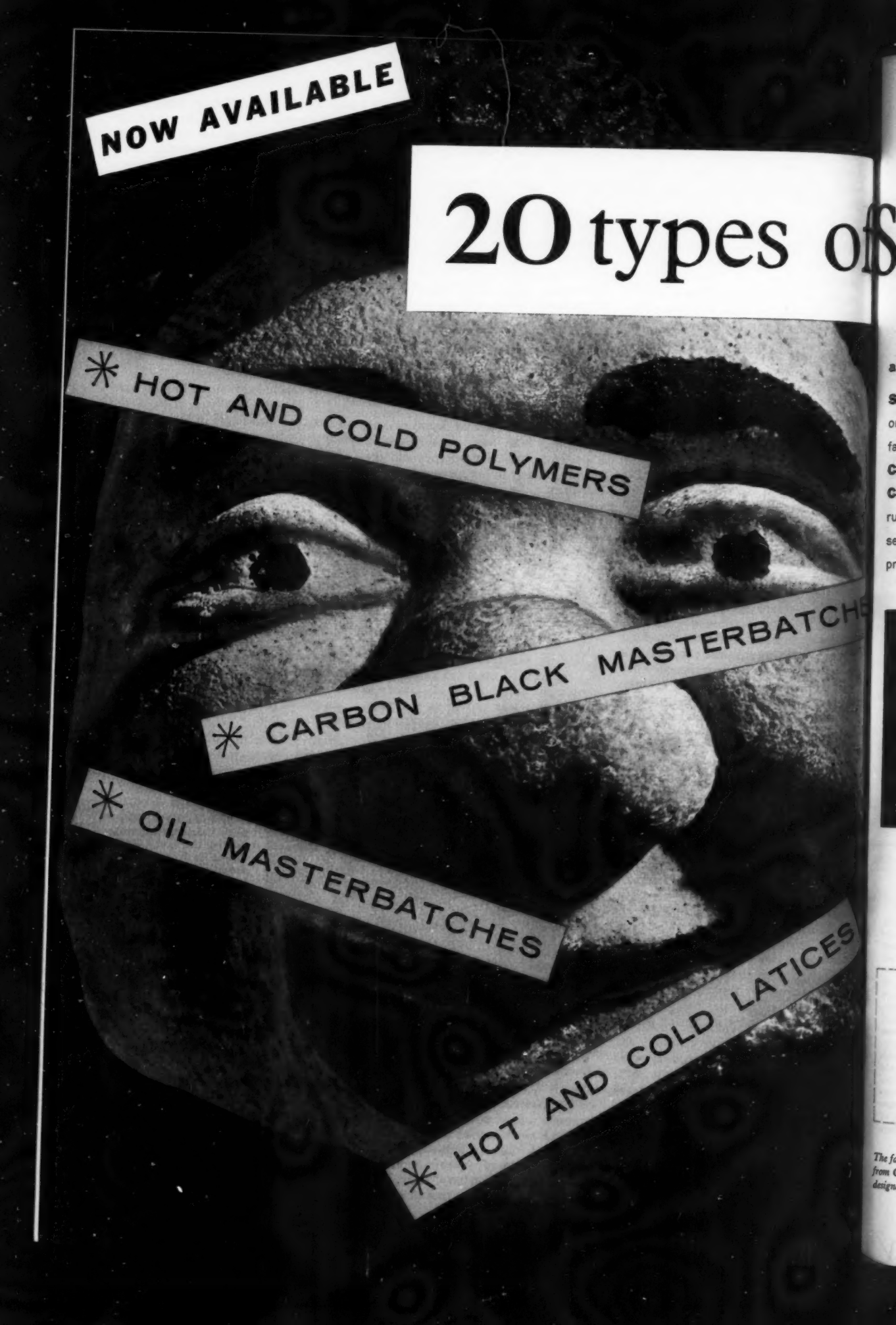
FOR the first time the inflatable liferaft can be regarded as lifesaving equipment suitable for all classes of vessel. This was proved at a demonstration, attended by Ministry of Transport and Civil Aviation officials and representatives of overseas governments, staged from the British Railways vessel 'Maid of Kent,' now being completed at the William Denny and Brothers Ltd. shipyard at Dumbarton, Scotland, on Tuesday March 17.

A 20-man RFD liferaft fully laden in the water during the test. It was afloat in 2 minutes 20 seconds from the time it was collected from stowage

The system demonstrated was the culmination of a series of trials and research work carried out by the RFD Co. Ltd. of Godalming, Surrey, manufacturers of the rafts, and Schat Davits Ltd. of London Colney, Herts., to find the answer to the problem of launching liferafts from vessels with a high freeboard. Three fully manned 20-man liferafts were launched in succession from one Schat single arm davit. It took two minutes 20 seconds for a liferaft to be water-borne, fully manned, from the time it was collected from the stowage position.

Lecithin Agents

Fatoils Ltd. of 91/3 Bishopsgate, E.C.2, announce that Archer-Daniels-Midland Co., New York, the largest producers of Soya Oil in the United States have appointed them as their sole selling agents for Lecithin, which they are producing in plastic and fluid, bleached and unbleached uniform grades under strict specification control.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The face shown opposite is itself made from ***Cariflex*** *S2105, which is the latex designed for foam rubber manufacture.*

One of a series of international advertisements issued by The Shell Petroleum Company Limited, London, E.C.3, England. For further information, consult your Shell Company (in the U.K., apply to Shell Chemical Company Limited) who will gladly answer any questions concerning specifications, service and delivery, and supply you with technical data concerning all types of ***Cariflex.***

Administration and Management*

WORK STUDY—2

WORK study, said Mr B. H. Holden of Ekco Plastics Ltd., Southend, in his lecture at the National College of Rubber Technology, was the investigation and compilation of facts on work methods. It included the consideration of machine and tool efficiency as well as studies of the human operator. These latter had, in the past, been treated as time studies and motion studies but it was now recognized that they were inseparable and the joint title 'Work Study' was now used.

The introduction of work study was ascribed to the Gilbreths, who, in 1884, studied movements and visualized improvements. They endeavoured to find the best methods of performing an operation but found difficulty in persuading managements and workers to adopt their ideas.

Valuable Assistance

Work study was introduced to this country during the 1920's in conjunction with new schemes for providing financial incentives to increased productivity. Initially, false impressions were created by careless or clumsy presentation. When properly applied, these studies, and schemes based on them, did produce benefits to both employer and employee. They gave valuable assistance to the estimating and costing departments, but should be performed by a trained man as this ensured acceptance on the shop floor. Once instituted and accepted, they became part of the factory atmosphere and operators themselves did much of the streamlining of their movements.

Mr Holden then dealt with some details of the most suitable arrangement of tools for co-ordinated movements of the hands and with the importance of rhythm, before proceeding to describe techniques used by work study engineers. These ranged from the use of the decimal minute stop watch arranged for continuous reading to that of stereociné cameras.

First, the operation was broken down into elements, which were then timed consecutively and without delay between. The preferred time for each element was not more than 0.10 minute. Repetition of an element did not necessarily take the same time as the first, so the engineer's aim was to determine the 'standard time' which Mr Holden defined as 'the time taken by the average operator working at normal speed under average conditions.' As these conditions were difficult to attain, a levelling factor known as 'rating' was applied. Rating involved an assessment of the operator's speed of effective working.

To the standard time were added various allowances, which may total as much as 30% of standard, thus yielding the 'allowed time.'

A library of elemental values having been collected, it was possible to synthesize standards but Mr Holden warned against the use of such standards for incentive bonus purposes as operators tended to distrust a value which came to them 'out of the blue.' Nevertheless synthetic values could be very helpful for estimating, although finishing shop operations did not lend themselves to such treatment owing to the large number of different products and unpredictable variations. Buffing was quoted as an example; this depended upon many variables such as the state of the mould.

The lecturer, having discussed the treatment of operations which were machine controlled and such matters as work done within the cure time, went on to offer recommendations for those interested in the techniques of work study. The importance of recording all details was emphasized—thickness of flash and finish required, as well as the exact method and the numbers or descriptions of all jigs and tools used. This was necessary in order that when the job was put into production after a lapse, it need not be restudied. Every person concerned must be given to understand that any deviation from these methods and conditions warranted a restudy. Before issue of a standard, the supervisor must give a signed acceptance and the operator must be able to understand what the standard means to him in terms of money and the management must know its meaning in terms of output.

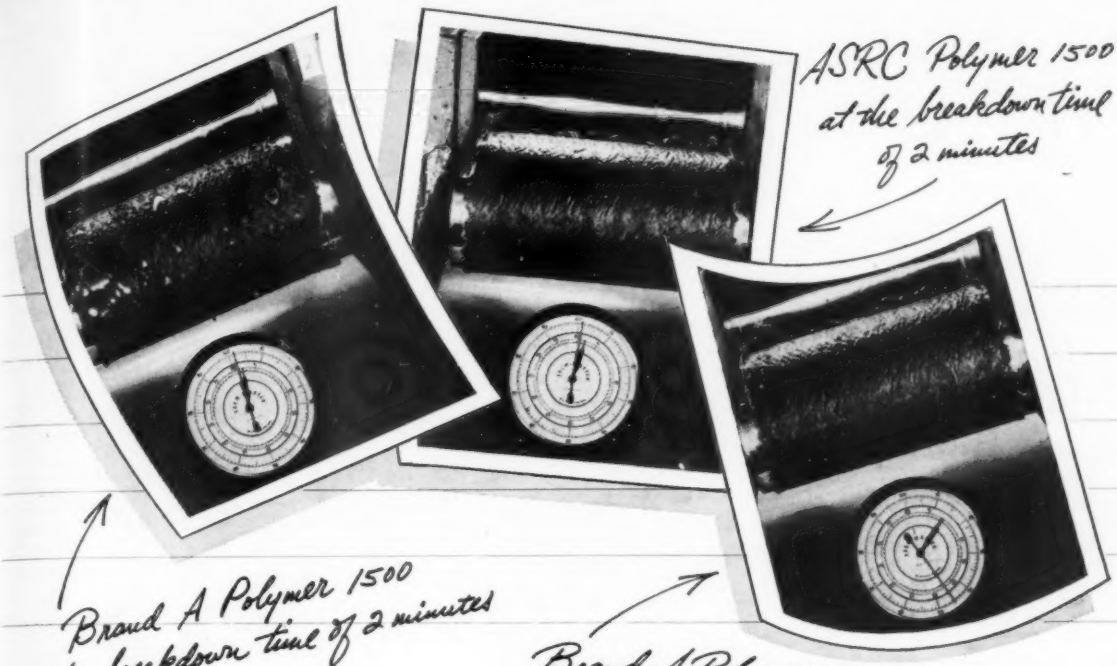
A time-study engineer should be a reliable mathematician, healthy and able to stand quite still in one position for long periods and also methodical and tidy. He should have quick reactions in order to assess rating, read a watch and write at the same time, an even temper, a sense of fairness and be able to talk to and be at ease with top managers, supervisors, shop stewards and operators. 'All must think you are right,' said the lecturer. Interested students were finally given guidance and recommendations for further reading and study.

* *Second in the current series of evening lectures on 'Some Aspects of Administration in the Rubber and Plastics Industries' at the National College of Rubber Technology.*

Chemical Merger

The Walker Extract and Chemical Co. Ltd., of Bolton, and its associated company, Arthur Ashworth Ltd., Fernhill Works, Bury, manufacturers of synthetic chemicals serving the plastics and other industries, have merged under the style of The Walker Chemical Co. Ltd., Rose Hill, Bolton.

Velbex, produced by BX Plastics Ltd., Chingford, London, E.4, has been used by Tanks and Linings Ltd. at the Shepcote Lane Works of Firth-Vickers Stainless Steels Ltd., Sheffield, to line this mild steel pickling tank, in the course of construction. The 135-ft.-long tank is used to remove scale and prepare the stainless steel strip for further processing. (Photograph by courtesy of Firth-Vickers Stainless Steels Ltd.)


ASRC Polymer 1500
at the breakdown time
of 2 minutes
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Report on Polymers

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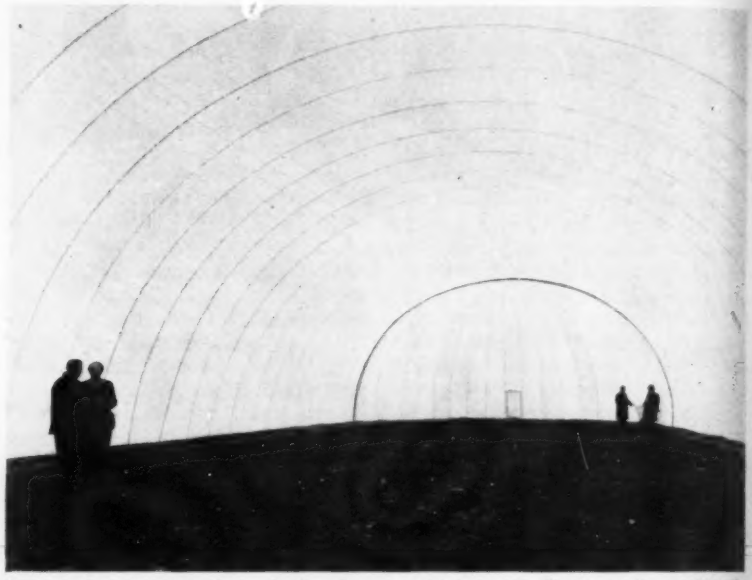
Inflatable Airhouse

TOUGH, DURABLE AND VERSATILE

CIVIL engineers, builders, farmers, organizers of exhibitions, fetes, flower shows and garden parties, members of survey and exploration teams, road makers and innumerable others will undoubtedly find many uses for the new inflatable 'Airhouse' now being marketed by the makers, The Gourock Ropework Co. Ltd., Port Glasgow, Scotland.

The house is constructed of synthetic fabrics, BNS nylon or I.C.I. Terylene, coated with PVC specially developed by British Geon Ltd. The PVC is compounded to withstand extremes of weather conditions. The standard coatings will withstand temperatures down to −15°C. without cracking and tropical weather without becoming tacky. The material is 100% dimensionally stable. An additional feature of note is that there are no supporting members whatever.

Erection of the 'Airhouse' is simple. The deflated house is laid out in sections which are then laced together. The base ring of the house, a wire rope, is secured by pegging it down or securing it by special fasteners. The house is then inflated by means of air blown in at a low pressure through one or two fans, although one fan only is necessary to keep it fully extended.



The impressive interior of the Gourock airhouse. Features immediately noticeable are the high level of well-dispersed light, the extent of the headroom and the entirely unobstructed area. Dimensions of the model shown are: length, 100 ft., width, 40 ft., height, 20 ft. "Uses are obviously legion

A 40ft. diameter Gourock airhouse erected on the lawn of a private house. Light weight and ease of handling make it ideal for public and social functions

The volume of air required naturally varies with the size of the house but as an example, a 100ft. x 40ft. house requires, for inflation, two fans each capable of delivering roughly 3,500 cu. ft. of air per minute at approximately 4in.–6in. WG pressure. The electrical power required for this size and type of fan is approximately 1hp and a 15 amp supply, usually single phase AC at 235/250 volts is adequate. Running cost per fan is about 1d. per hour. The pressure differential, internal pressure within the house against atmospheric pressure, is about 0.5in. WG.

Added points of interest about the 'Airhouse' include the fact that the continuous fresh air going into the house can be heated for cold climate use, air conditioned for tropical climes or refrigerated — specially formulated coatings will stand 50° to 60° below zero F. The 54,000 cu. ft. of air is changed every 11½ minutes. The centre section of the model demonstrated (100 x 40 x 20ft. high) weighs no more than 3–3¼cwt. when deflated and occupies 6 x 6 x 3ft. Each end section weighs 1½cwt. Normal size doorways were fitted to the demonstration model but doorways large enough to admit trucks will be available. Surprisingly enough, the light intensity inside the house is normally higher than outside. Price of the model shown last week is understood to be £1,080 complete, including fans. 'Airhouses' can be made to almost any size by joining together standard sections.

Baker Perkins at NECE

Baker Perkins Ltd. will have a stand at the National Education and Careers Exhibition which will be held at Olympia, London, from Tuesday May 26 until Friday June 5.

The purpose of the company's exhibit is to show to young people the first-class training schemes which are in existence in the group to enable them to fill a wide range of worthwhile positions in an organization which supplies a wide range of engineering products for many essential industries throughout the world.

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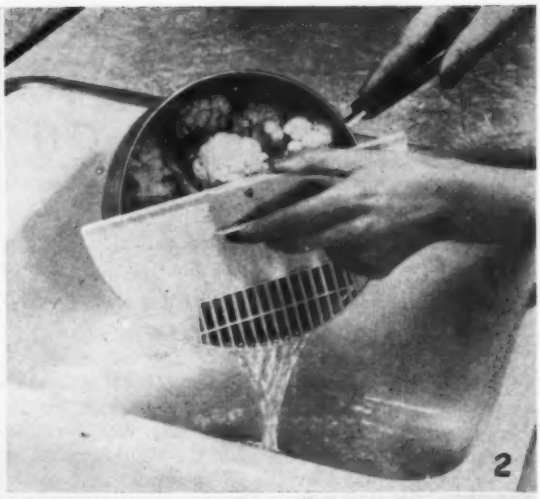
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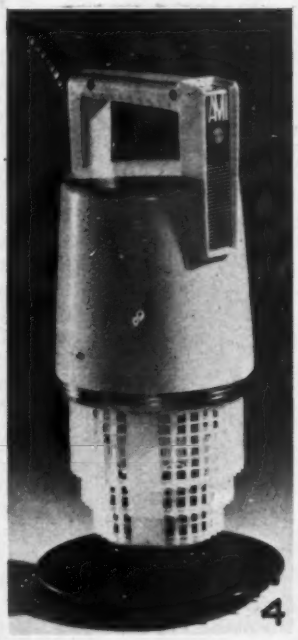
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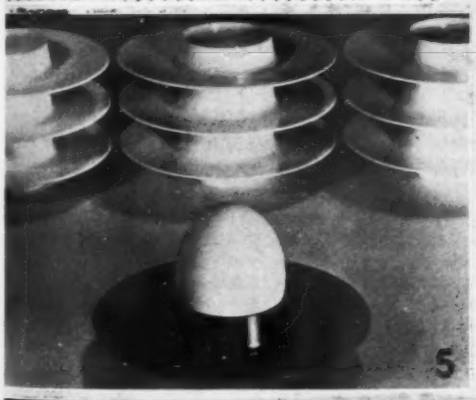
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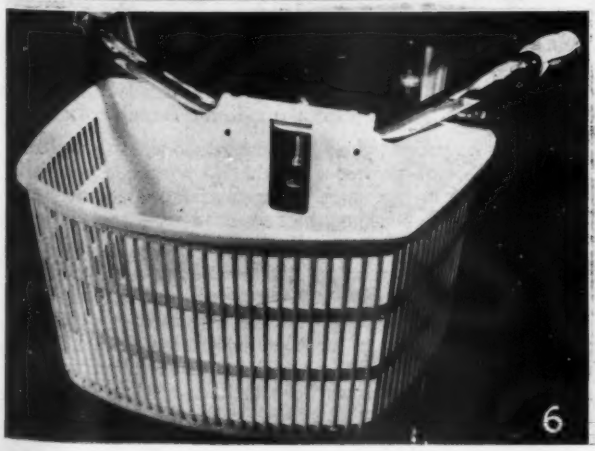
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Plastics Exhibition

DESIGN DISPLAY

One of the special features of the International Plastics Exhibition at Olympia, June 17-27, will be a Design Display. A prize of 100 guineas will be awarded to the designer of the product considered to be the best in the display. A representative selection of some of the 200 products in the competition is: 1. Buckets (Finland); 2. food drainer (USA); 3. snack bar cutlery (West German Republic); 4. portable washer (USA); 5. stacking egg cup (Denmark); 6. bicycle basket (Canada); 7. bowls (Sweden)

VIEWS *and* REVIEWS

Future of NR

IN 'Notes of the Week' for March 21 there was, in connexion with the potential use of 'synthetic natural rubber,' *i.e.*, man-made rubber based on synthetic isoprene, a reference to 'an excellent article in the February *Rubber Age*,' by Dr John McGavack. The article in question appears to be a notable publication, and hence the present review.

Dr McGavack

Until recently, as the *Rubber Age* points out, Dr McGavack was technical director of the Plantations Division of the US Rubber Co., and was well known as a research chemist in the General Laboratories of the said organization. Many US patents in the latex field have been issued in the doctor's name, and, *inter alia*, his activities in, and many years of service as chairman, of the Bibliography Committee of the 'Rubber Division' are also greatly to his credit. The present article by Dr McGavack commences thus :

'The future of natural rubber has never been rosier. Its existence and use will continue as long as it is necessary and desirable for human hands to do manual labour. . . . These are bold words, but it is believed that the present development of commercial rubber products fully justifies them.'

Dr McGavack's view to the effect that 'The outlook for natural rubber has never been brighter . . .' is based on production costs, and on 'technological advances—particularly chemical stimulation of the trees to increase yields.'

Quality and Cost

As was recently postulated (and mentioned on this page) it seems to be agreed (a view which is taken by our author) that about 30% of the production (of rubber articles) require NR regardless of cost, and about 30% require the synthetic type. It follows that about 40% of production can use either, depending on its cost. 'This percentage holds even if the newer synthetic types which are quite similar to natural rubber are taken into consideration,' and then, Dr McGavack proceeds:

> 'This statement means then that for many applications natural rubber will be used just as long as it can be prepared at a cost cheaper than an exact similar synthetic type.'

The Crux of the Question

On what does the survival of NR depend? Our author —justifiably, I believe—opines that:

'To a great extent, then, the survival of natural rubber will depend upon the technical fact of whether a synthetic variety similar in all characteristics can be synthetically made *at a cost as cheaply as natural can be grown.*' (Italics are the reviewer's.) 'This then is the sixty-four dollar question.' The first part of this criterion—with a few minor exceptions, Dr McGavack holds, 'can be answered in the affirmative—witness the synthetic types known as Coral and Ameripol SN.' (Refs. given.)

Cost

I may mention that it has been pointed out on this page that no authoritative statement appears to have been made as to whether synthetic polyisoprene can be produced at a competitive price, or rather at a price allowing of an estimate as to a reliable figure of ultimate cost. On this point our author says:

'As to cost, the figures so far available indicate to this writer that such a synthetic material could be commercially produced for $1.00 per lb.; there have been other reports that the cost could be pared to 60 cents a lb.; there have been other still more optimistic reports stating that in large quantities a suitable counterpart of natural could be produced for 36 cents a lb. All of these figures are higher, and some considerably higher, than the cost of natural rubber is ever likely to be. . . .'

In explanation of this view McGavack refers to the expensive nature of some of the materials required in SR manufacture, which, however, are 'cheaper than similar substances employed by the Hevea tree in producing rubber *would be if they had to be purchased.*' (Italics are mine, P.S.) At this point there is an interesting reference to some unpublished work by Faulks and a team (*cf. original and ref.*). It amounts to showing that the system by which rubber is produced in the plant is not simple, and 'Would be expensive.'

NR v. SR Cost

McGavack follows up here by comparing the fundamental materials and processes cost of Tree v. Synthetic. Naturally the post-war advantage in this regard for SR is, mainly, I believe, due to increased NR labour cost, which, pre-war was, as readers of *RJIP* may know, something like 1/10th to 1/20th of what it is today on a well-managed plantation. On this labour question our author says:

'At the present time the actual labour cost of plantation rubber is greater than that of synthetic. This is mainly due to the much larger number of labourers employed per unit of production on a plantation than is necessary in a synthetic plant. . . .

'To partially overcome this greater use of hand labour the modern plantation will be organized on a somewhat different basis. . . . For example, at present a lot of time and labour is used to carry the latex from the field to the collecting station. This is mainly due to the present low yield where many trees have to be tapped to produce a

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

reasonable amount of rubber. Where new high-yielding clones are introduced, motor pick-up trucks can be used in the field. Such collection procedures will allow the tappers to put more time on tapping and less on carrying latex to the central station or factory. . . .'

Other potential methods of reducing labour costs are are also mentioned.

Multiplication of Future Yield

Whatever possibilities exist in connexion with the reduction of labour cost, there are at least—as mentioned by the author—three other, and promising, methods of reducing the total cost.

The first of these, of course, is replanting with high yielding material. This has been much publicized, but the figures mentioned by McGavack in this connexion should be mentioned. He puts the production of estates planted many years ago at about 375lb. per acre; a well-managed average estate which has been cultivating rubber for a long time should have a production level of about 750lb.; this same well-managed estate should be able to look forward to increasing its yields (by means of well-tested clones) up to as much as 1,800lb. per acre. McGavack's overall opinion on this is that ' it would appear that increased yields will outstrip increased labour costs.'

Secondly, there is to be considered increasing yield by means of soil nutrition in connexion with which a considerable activity is now being carried on. The author considers that this work involves a real scientific approach, and is not a hit-or-miss application of a few nutrients here and there. The details in connexion with this development make highly interesting reading, and, to sum up, there is a reference which indicates that McGavack considers that this approach to increase production is on a sound footing.

As regards the third method of increasing production 'there is another technical development of great importance which is on the threshold of being put into large commercial use.' This, the author suggests, might be termed ' catalytic stimulation.'

Catalytic Stimulation

McGavack explains or defines ' catalytic stimulation.' He says:

'The reason for such a definition is that the method requires a very small dose of particular chemicals applied at infrequent times to bring about tremendous changes in the yield of the rubber tree. Actually a few milligrams of the right chemicals applied to each tree twice a year has a decisive effect. After 12 years of experience it would appear that such treatments not only do not have a harmful effect upon the rubber tree, but actually improve its health pattern. Twenty-five to 40% increased yield can be obtained by this method—all at an insignificant expense.'

The author gives details regarding the methods of ' stimulation ' and some striking figures. I suggest that the whole of this section in the paper should be carefully studied. From his statistics I am reproducing only one item, namely, that which he describes as ' from the records of my own company.'[1] The figures are as follows:

Time (years)	Control Area (pounds)	Stimulated Area (pounds)	% Stimulated/ Control
3	4,958	7,875	158

Origin of Stimulation

With regard to the origin of the process of ' stimulation,' Dr McGavack says that ' it seems that current or present-day stimulation had its origin in the plantation division of the French Institute in French Indo-China,' and gives some particulars in this regard.

Stimulation—Professor Tixier's Views

In the January 1959 issue of *Revue Générale du Caoutchouc* there is a paper[2] by M. Pierre-Paul Tixier, Professor at the Lycée Yersin, Dalat, Viet-Nam (French: pp. 73-79; English: p. 7), entitled ' La Latex D'Hévéa,' with subtitle ' Physiologie et Physiopathologie des Conditions de sa Production ' (English: ' Physiology and phytopathology of natural latex production'). M. Tixier, it is mentioned, took part in a research with M. P. Compagnon on stimulation of the production of Hévéa when he was chief of the Physiology Service at the Rubber Research Institute of Viet-Nam. He considers that the most interesting results have been obtained with copper sulphate,[3] but, like Dr McGavack, is somewhat dubious as to the wisdom of its application (' son emploi est délicat ').[3] However, with regard to the use of one of the two stimulants mentioned by Dr McGavack as having ' had the widest use so far,' namely, 2,4 dichlorophenoxy acetic acid (2,4-D), Prof Tixier says (*English translation, as given*): ' Preference has been given to the 2-4 dichlorophenoxyacetic acid. . . . Although this method is not devoid of risks, it is now popular in Malaya and Indochina. We feel that this is one of the most useful applications of 2-4D, since it is estimated that Viet-Nam production has been increased, on the whole, by several thousand tons, through this process.'

I must not be regarded as giving any worthwhile opinion of my own on the question of hazard, but, on the whole, the data published by McGavack and the view expressed in the last paragraph of his consideration of the Stimulation process, namely:

> ' This gives excellent insurance that stimulation is here to stay, and will almost definitely ensure the production of natural rubber at a price considerably lower than any synthetic. Stimulation will be a real boon to the production of natural rubber.'

leave little doubt as to his (McGavack's) opinion.

PHILIP SCHIDROWITZ

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[1] *Reference* (12): 'Unpublished work, Plantations Division, US Rubber Co., New York, N.Y.'

[2] ' Mémoire présenté le 16 octobre 1958 a la Faculté des Sciences de l'Université de Paris. . . .'

[3] Professor Tixier classifies Stimulants as covering: Tapping (*i.e.* through the bark to the latex canals); Stimulation by means of heat; do. by cold (*i.e.* working during cool periods as found in South Viet-Nam), and finally by means of chemicals. As regards the latter he says (English translation, p. 7): ' However, chemicals are more easily successful. In the Far East two types of chemicals have been used: mineral salts and artificial plant hormones.' His remarks as to copper sulphate, etc. (as above), then follow.

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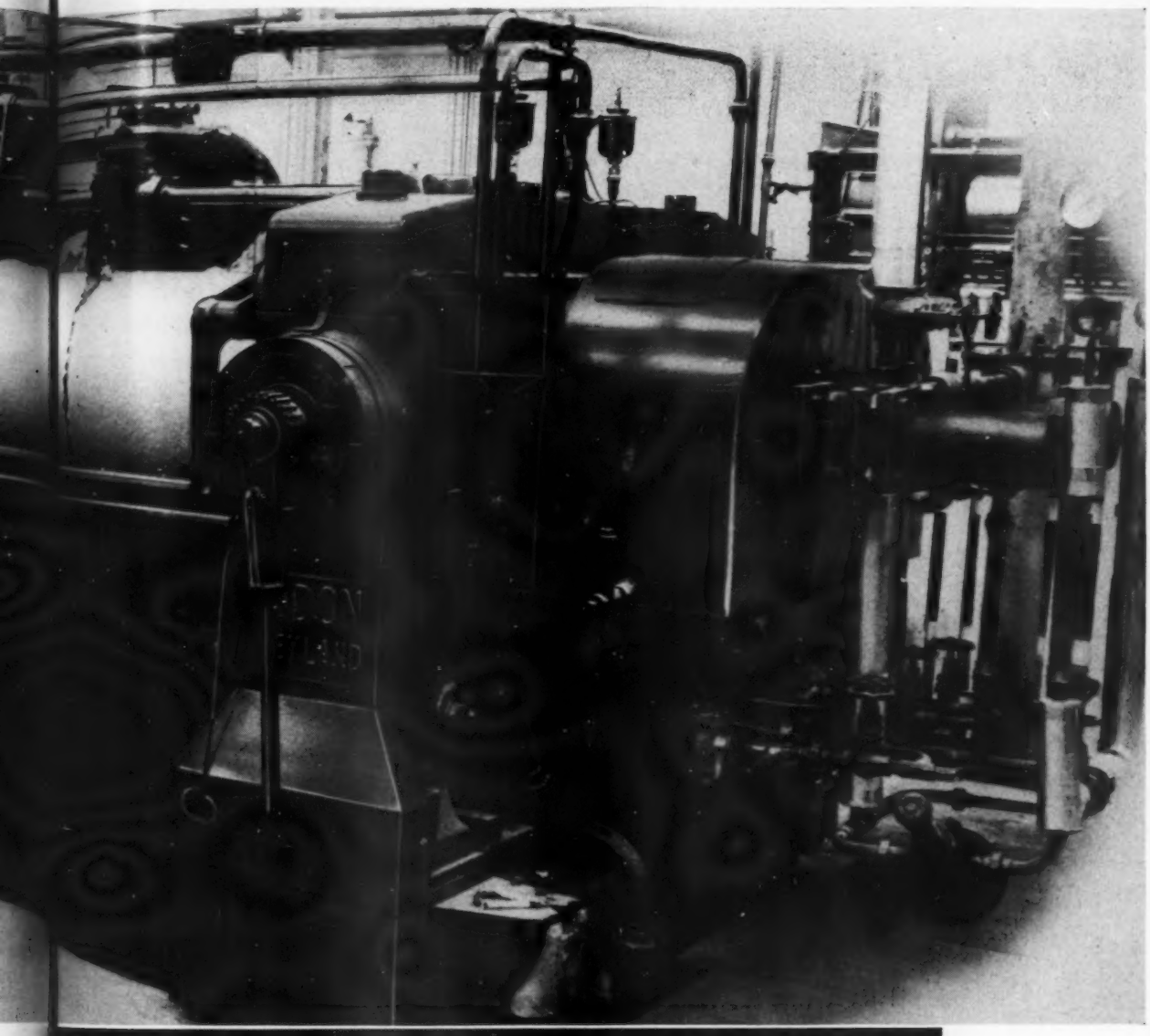

Twin Unit Mills

Photograph by courtesy of Messrs. B.T.R. Industries Ltd., Leyland, England

ONCE AGAIN IDDON'S LEAD THE FIELD

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AN TRUDING MACHINES FOR RUBBER AND PLASTICS INDUSTRIES

Questions Corner—67

(Second Series)

287. Polymerization by casting is used in several applications. Give some details.

288. What are the ingredients used in the formulation of a typical polyvinyl acetate emulsion paint?

289. In addition to polyvinyl chloride fibres there are polyvinyl chloride co-polymer fibres. Give some details.

290. What types of nitrocellulose inks are used, and for what purposes?

(Answers next week)

Answers to Questions Corner—66

283. Some of the factors that influence the flow of a lacquer or paint depend on the formulation, conditions of application, the season of the year and particularly the weather at the time of application. The various factors may be summarized as follows:

Formulation. a. The rate of evaporation of the volatile ingredients included in the lacquer. b. The nature of the solvents and diluents in respect of their solvent power. c. The viscosity of the lacquer. d. The surface tension. When brushing on a lacquer the brush leaves some irregularities in the film and the force of surface tension acting against the consistency of the paint tends to level out these irregularities.

Application. a. The thickness of the applied film. b. The distance of the lacquer travel from the spray gun to the surface being coated. c. Temperature of the lacquer and of the atmosphere. d. Good ventilation of the shop, or booth, where the lacquer is being applied is essential, quite apart from any consideration of fire or health hazards. e. Shape and size of the product being coated. f. The number of coats being applied, and if more than one, the rapidity with which those after the first one are applied. g. The nature of the surface in the sense that the flow will be different when lacquers are applied to porous or smooth surfaces.

284. Dibutyl phthalate ($C_6H_4(COOC_4H_9)_2$) is a phthalic ester of considerable use in the plastics industry. It is light fast, colourless with a faint odour. Although stable at normal temperatures it decomposes at its boiling point, *i.e.*, 330 to 340°C. It is considered as non-toxic for most purposes.

It is compatible with cellulose acetate up to about 10%, by weight and is used with that material as a secondary plasticizer to assist flow at the high temperature encountered in injection moulding and extrusion. It is compatible in all proportions with nitrocellulose and is used in lacquer formulations because of its good solvent power for a number of natural and synthetic resins. Dibutyl phthalate is also a useful plasticizer for other cellulosics, *e.g.*, ethyl cellulose, cellulose acetate butyrate, cellulose acetate proprionate.

The most important use for dibutyl phthalate has been as a plasticizer for polyvinyl chloride, and co-polymers, usually as a joint plasticizer with another. It is useful as a medium for grinding pigments and as a plasticizer for polystyrene, polymethyl methacrylate, polyvinyl formal, and polyvinyl butyral.

Apart from these uses it is used as a softener for some synthetic elastomers such as neoprene, GR-S, and nitrile.

Properties: Specific gravity, 1.047-1.050 at 25°C.; melting point —35°C.; molecular weight, 278; flash point, 171°C.; sol. in water, <0.01% at 20°C.; acidity, <0.025% (as phalic acid); evaporation rate, 0.98mg./cm.²/hr. at 100°C., 148.00mg./cm.²/hr. at 190°C.; viscosity, 25cps. at 20°C.; solubility in mineral oil, 34% at 20°C.

285. Unpigmented nitrocellulose lacquer emulsions can be prepared quite easily although stable pigmented ones are rather more difficult. A protective colloid is necessary to counteract the tendency to phase inversion. In making these lacquer emulsions the idea is to keep the two phases of the emulsion as unlike as possible while they are separate, so that they form a continuous film as soon as the water has evaporated, or absorbed into the coated surface.

The nitrocellulose should be damped with butyl alcohol rather than ethyl alcohol as the presence of the lower alcohols is undesirable. The water phase contains the emulsifying agent, *e.g.*, a soap or fatty acid ester of triethanolamine, and, if pigmented, a protective colloid such as methyl cellulose or polyvinyl alcohol should be used.

Nitrocellulose lacquer emulsions have the advantage that it is possible to use fairly concentrated lacquers as the disperse phase and reduce the final viscosity to a low value by emulsifying with a small quantity of water.

The main advantage is the fact of water being used. Disadvantages are that the evaporation rate cannot be altered and it limits the type of surface that can be coated, *e.g.*, as water will rust iron, and swells wood, it is not desirable to use emulsions on these two materials.

286. The use of the term 'alpha cellulose' content is an analytical expression used to indicate the amount of wood pulp which will remain undissolved in a caustic soda solution of certain concentration. There are several methods for determining this and one is given in TAPPI.T203-44. Normal grades of a bleached dissolving pulp contain about 90% alpha cellulose but for certain process a higher purity is required and further refining is necessary.

The refining is usually carried out, in the alkali treatment, between chlorination and hypochlorite bleaching and one of two methods may be used: a. Hot refining using a temperature of 100-120°C. and dilute alkali, or; b. Cold refining at room temperature with an alkali concentration of 10%.

The hot process gives a degradation of the non-alpha constituents and some of the alpha cellulose also. The cold process gives dissolution of the lower molecular weight impurities and causes the fibres to swell. It will be apparent that the hot process yields lower amounts than the cold process but is generally preferred as it requires a lower consumption of alkali and gives better pulp properties. The Alpha content is about 96% for the hot method and 98% for the cold.

Non-alpha impurities may cause haze in cellulose ester plastics, increase the nitric acid consumption in the nitrate conversion and obviously it is essential to remove them (TAPPI 1954, *37*, 225 and 440). Substances which yield ash consist partly of small mineral particles conveyed into the pulp with the water, etc., and may lead to difficulties in filtering solutions of the derivatives, and also may cause haze.

Other groups in the cellulose molecule are formed by oxidation and result in reducing properties in the pulp, *e.g.*, the carbonyl groups. Care has to be exercised during bleaching to avoid oxidation of the carbohydrates (J. Text. Inst. 1934, *25*, T174; 1940, 31, T81; 1941, *32*, T109). Because of its white colour and low density alpha cellulose is used as a filler in urea and melamine moulding powders.

(More questions next week)

'Die head? Something like a peroxide rinse'

MEN and MATTERS

A Review of People and Events

by George A. Greenwood

ONE of the most interesting items of news this week is the announcement that after something like nearly 40 years' association with Imperial Chemical Industries Ltd., Sir Ewart Smith, a deputy chairman and authority on works organization and management is to retire. Interesting but also rather sad because he has now for two decades been something of an institution in that great undertaking and he is retiring at the comparatively early age of 62, albeit a very active and vigorous 62. This, however, is the age of retirement for directors of I.C.I.

Sir Frank Ewart Smith was educated at Christ Hospital and Sidney Sussex College, Cambridge, and apart from his association with I.C.I. he is particularly well known and remembered for his work in the Government. He was, for example, from 1924-1945 chief engineer and superintendent of the armament design department of the Ministry of Supply and he is a former member of the Scientific Advisory Council of the Ministry of Fuel and Power and he was also on the advisory council of scientific forestry. He is a one-time chairman of the British Productivity Council and a member of the committee on scientific man power and he is an M.I.Mech.E. and an M.I.Chem.I. As far as I.C.I. is concerned, Sir Ewart will always be remembered for his work as technical director and for his interest in the labour force and conditions. One of his slogans is to make management better rather than to make workmen work harder, and as most people know he played a great part in the preparation and working-up of the great I.C.I. profit-sharing schemes.

Sir Ewart is not, of course, to be idle. He could never be idle. I hear he is to become chairman of a council to further efficient techniques in the National Health Service.

Colonel A. N. Weir

It is not, I hope, too late to say a few words about the death recently of Colonel A. N. Weir, 'Alec' to his friends, another stalwart of I.C.I., associated with the company's activities for Tees-side. He was with the company for several years before the second world war and then from 1939, as an old territorial officer, he was called up from industry and served with great distinction from the disaster of Dunkirk down to the great Middle Eastern campaigns until he finished up with his colleagues at Hamburg in the victories of 1945.

After hostilities Colonel Weir went back to I.C.I. and played a large part in the development of the Wilton works, first as plastics division works manager and then as personnel manager.

American Visitors

There has just reached England a body of some 80 visitors from the USA—members of the New York Society of Security Analysts—representing banks, broking firms, insurance and investment companies. The reason given to the visit is the growing interest of American investment in foreign securities but it is apparently going to be a very thorough investigation of the basis of British industry and its operations, for no fewer than 18 companies are going to be called upon at their business quarters and are going to be quizzed. These include Dunlop, I.C.I., and Courtaulds, to name only a few.

Windsor in Germany

It is announced that Webley and Scott, the small arms manufacturers and precision engineers with which R. H. Windsor Ltd., the well-known plastic engineers, are now associated, is establishing a German manufacturing and sales subsidiary. This is to be known as R. H. Windsor Ltd., and will be at Frankfurt am Main. The directors are Mr Arthur G. Dennis, L.L.M., Mr R. E. G. Windsor, Mr P. C. Windsor and Mr Adam Rohé. The Windsor Webley group have, of course, a factory at Frankfurt.

Pensioners' Party

Sixty-four retired members of the Leyland and Birmingham Rubber Co. Ltd., Leyland, near Preston, were given a party in the works canteen on March 21. Mr H. Jackson and Mr J. Stopforth, directors of the company, attended, and the pensioners, with service totalling over 3,000 years, were welcomed by Mr M. Brady, chairman of the Works Committee. The oldest pensioner present was, I understand, Mr Jim Riding, who celebrates his 91st birthday on June 21. Entertainment included listening to the commentary of the Grand National on the radio, a film show and a sing-song round the piano.

New Chemical President

The announcement that Mons E. J. Solvay has been appointed by the Council of the Society of Chemical Industry to succeed Sir Robert Robinson, O.M., F.R.S., as its president, has naturally aroused a lot of interest. And for more than one reason. In the first place I believe that this is the first time in all its history that a man outside the British Commonwealth has been given this signal honour. In the second place, M Solvay is a member of a great family for generations associated with industrial chemistry. And in the third place he himself is a man of eminence and fame. There are other reasons, but these will suffice for the time being.

He is, of course, closely associated with the great Belgian concern of La Société Solvay et Cie., of which, since 1947 he has been president, and he is the grandson of Ernest Solvay, the discoverer of the ammonia soda process which still bears his name. The fact that the Solvays are immensely, indeed fabulously, rich is due, I am told, to the fact that the company has always retained its rights in Ernest Solvay's discovery, and that it permits production only under licence. I am told that I.C.I. are holders of the British licence.

Benefactors

It is pleasant to know that the Solvay family are wise and generous users of their wealth. A considerable time ago, it set up an organization something like the Nobel Trust and the Ford Foundation, and its benefactions have been widespread and considerable, including the setting up of an institute of chemistry and physics, and M Solvay is a member of the governing body of all of them.

M Solvay was on military service in the first world war, during which he was awarded the Croix de Guerre, and in 1940 he was recalled to the Army, serving as a captain command-

ing in the Artillery. He is now an honorary major in the Army reserve. For some years he has been an honorary foreign member of the Society of Chemical Industry, and it is surely unnecessary for me to add that he has a host of friends in this country and the Commonwealth. I might add that M Solvay is also a Commander de Leopold, an officer of the Legion of Honour, and has honours from Italy and Yugoslavia.

When the annual meeting of the society is held in Glasgow in July it is certain that due tribute will be paid to the great services of Sir Robert Robinson as president, a post to which he has brought long years of knowledge and experience.

The Rubber Proofers

And here is news of another interesting appointment. The Rubber Proofers' Association, so closely associated with the North, has a new chairman of its technical committee. Mr W. N. Lister of Messrs J. Mandelburg and Co. Ltd., has had to retire owing to ill health. He had been in that office for a very long period. Mr Lister's place has been taken by Mr D. W. Elstub of Messrs Proofings, Ltd., of Cheetham Street, Manchester.

Off to Africa

Mr R. B. Benians, a director of Universal Asbestos (Overseas) Ltd., and also general manager of the Exports Division of the UAM Group, will leave the UK by air on April 28 for a six weeks' visit to West Africa. His purpose is to renew existing contacts and to make new ones, and to appraise the markets for the Group's building products—asbestos cement, pitch fibre pipes and Unilux translucent sheeting. Mr Benians recently returned from a similar visit to the West Indies.

Mr A. L. Viles

Mr A. L. Viles, who died on March 12 in New York, was a former president of the Rubber Manufacturers' Association, Inc., from 1935 until his retirement in December 1954 and general consultant to that organization since that time. Aged 70, he had been associated with the rubber manufacturing industry in the US since 1919 and was widely known in both rubber producing and rubber consuming countries throughout the world. His business career in New York City began in 1910 as a special agent for the official classification committee for the Eastern Railroads. In 1918 he became secretary and general manager for the traffic committee of the Rubber Association of America. He served for four months in 1919 in reorganizing the Trunk Line Association's weighing and inspection service for Eastern Railroads, returning to the Rubber Association of America in July of 1919 as secretary and general manager. On January 7 1935 he was elected president of the successor organization, the Rubber Manufacturers' Association, Inc.

During the thirties and until it was dissolved in World War II, Mr Viles served as the US industry observer at meetings of the International Rubber Regulation Committee which met frequently in London. He served as an industry advisor to the US representative at meetings of the International Rubber Study Group from the time it was organized in 1945 until 1953. He served as an advisor to the Rubber Reserve Corp. of the Reconstruction Finance Corp. during World War II and spent much of his time in Washington during those years. He also served on industry advisory groups to the Defence Department, the Department of Commerce and the General Services Administration.

Factory Equipment Exhibition

RUBBER AND PLASTICS REPRESENTED

'WE have a great wealth of technical know-how in this country and it is our duty and our privilege to put it to work. We are not, perhaps, always quite as ready as we should be to do this. We are, with some justification, criticized for failing to be as vigorous in application of knowledge as we are in prosecuting research. We must not fall behind in this, for it is the key to future prosperity. Upon this depend our hopes for higher living standards at home and an improved competitive position in world trade.' This was one of the points made by the Minister of Power, Lord Mills, when he opened the Factory Equipment and Heat and Sound Insulation Exhibitions at Earls Court, London, on Tuesday. The Exhibitions finish on April 17. Following is a list of some of the companies exhibiting, with brief details of the products they are showing:

Geo. H. Hughes Ltd., Edgemond Avenue, Birmingham 24. Tyres made of natural and synthetic rubber and phenolic resin wheels for heavy loading. JCP (Industrial Clothing) Ltd., 2 Sycamore Corner, Amersham, Bucks. Industrial clothing and safety wear made of a variety of materials including rubber, PVC and plastochrome. W. Langley and Co. Ltd., 14-16 Magdalen Street, London, S.E.1. Flexible rubber doors for use in industrial premises. Northide Ltd., Impervia House, George Street, Hyde. The well-known range of industrial protective wearing apparel. Vulcascot (Great Britain) Ltd., 87-89 Abbey Road, London, N.W.8. Anti-vibration pads. Plastic pipes and fittings. Conveyor belts, hose and matting. ABDIC Ltd., Vulcan Works, Vulcan Way, New Addington, Croydon, Surrey. Plastic pipes and tank linings, etc. H. J. Baldwin and Co. Ltd., Baldwin House, 132 Arkwright Street, Nottingham. Plastics for use in building, flooring, etc.

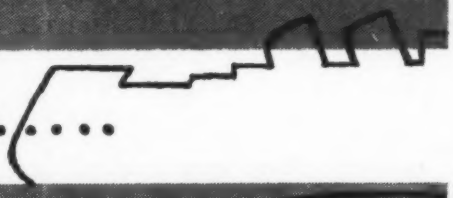
Baxenden Chemical Co. Ltd., Clifton House, Euston Road, London, N.W.1. Examples of 'Spandoplast' expanded polystyrene, for thermal and acoustic insulation, and 'Spandofoam' foamed polyurethane. Combined Optical Industries Ltd., Plasta Works, Bath Road, Slough, Bucks. Plastic lenses and developments of plastics for optical applications. Commerce Factors (GB) Ltd., Gallows Park, Torpoint, Cornwall. 'Poron' sheet for insulation and other applications. Cooper and Co. (Birmingham) Ltd., Brynmawr, Breconshire. Plastics foam for all industrial uses. General Binding Co. Ltd., Doman Road, Camberley, Surrey. Plastic binding units and associated equipment.

J. R. Enterprises Ltd., The Green, Pirbright, Surrey. Expanded polystyrene insulation material and its applications for packaging. Jablo Plastics Industries Ltd., Mill Lane, Waddon, Croydon, Surrey. 'Jablite' expanded polystyrene insulation material. Schofield H. I. Products Ltd., Newtown Mill, Cow Lane, Burnley, Lancs. Expanded polystyrene insulation for pipework, etc. Silvaflame Col Ltd., 218a Monument Road, Birmingham 16. Various fabrications in 'Perspex.' UAM Group of Companies Ltd., Tolpits, Watford, Herts. Thermal insulation materials.

M E. J. Solvay of Brussels has been appointed president of the Society of Chemical Industry to succeed Sir Robert Robinson.

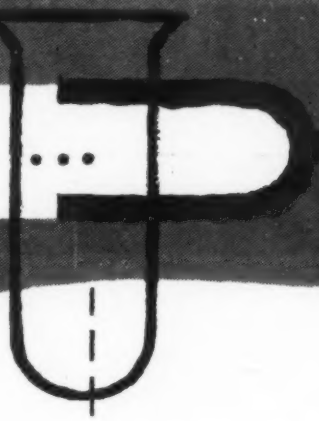
Mr S. B. Cant has been appointed to the board of Lintafoam Industries.

HIGH AND LOW VOLTAGE CABLES.....



ENGINEERING RUBBER COMPONENTS.....

RUBBER FOR INDUSTRY.....



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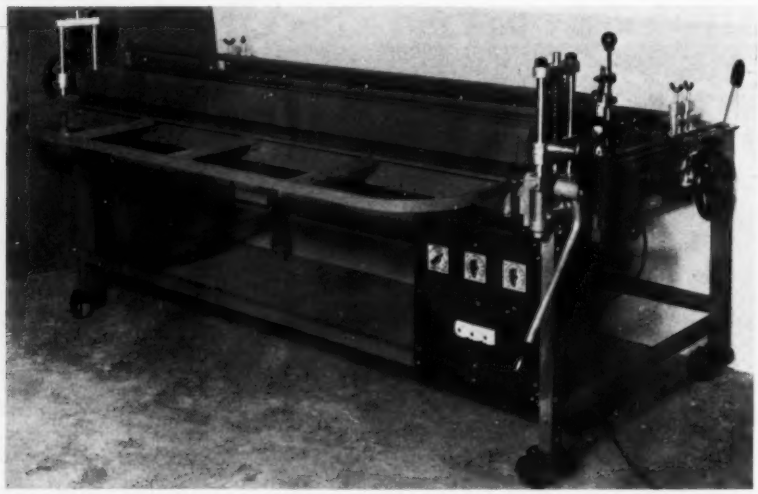
Bending Machines

FOR PVC AND POLYTHENE SHEET

PORTABLE bending machines, specially designed for rigid PVC and polythene sheet, are being marketed in the UK by Delbag Air Filters Ltd., Arundel Road, Trading Estate, Uxbridge, Middx., sole representatives of Delbag Luftfilter GMBH, Berlin. Known as 'WEG' bending machines, there are four sizes available with different lengths of working table, *i.e.*, 40.157 in., 59.842in., 79.527in., and 118.900in. The top of the machine consists of a ⅛in. thick steel plate which, in the case of the third size, measures 79.527in. × 39.370in. The working height of all machines is 31.496in.



The standard bending bar of the WEG bending machine is square in cross section and is provided with different radii to suit different sheet thicknesses. Bending bars with special profiles can be supplied as an extra

An interesting feature of the machine is the bending jig. It consists of a support of the same height as that of the working platform of the machine, the bending bar with bearings on each end and a dial which allows for accurate setting of the angle to which the sheets have to be bent. The standard bending bar is square in cross section (4in. × 4in.) and is provided with different radii to suit different sheet thicknesses. Bending bars with special profiles can be supplied as an extra.

A 1½in. wide slot in the table top runs parallel to the bending jig. Over and underneath this slot special infra-red strip heaters are mounted which can be turned laterally to deflect the radiation emanating from the strip heaters. The distance between the strip heaters and the material can be adjusted within certain limits. Louvres are provided underneath the slot in the table top to widen or narrow the zone of radiation in accordance with the thickness of the sheet.

Two heavy T-bars are located adjacent to the top infra-red strip heaters; these serve a dual purpose in that they can be used to hold down the sheet and they can be used to adjust the width of the radiated zone. The T-bars can be lowered or raised by means of a lever simultaneously with the top strip heater. A locating pin holds the strip heater and T-bars in any desired position.

The total current input of the infra-red heaters amounts to 4,000 watts. The strip heaters are connected in such a way to the 380/220V 3-phase mains that one phase feeds the first 20in. while the next phase feeds the next 40in. and the third phase feeds the last 20in. of both strip heaters. For each of the three sections a regulator is provided so that individual sections can be switched on or off. Cut-outs are also provided for each phase. WEG bending machines can also be provided with an attachment for welding and bending polythene as an extra.

Plastics foam products will be among exhibits at the International Hospital Equipment and Medical Services Exhibition, which is to be held at Olympia, London, on May 25-30.

GOODYEAR OF CANADA

Goodyear Tire and Rubber Company of Canada Ltd., in year ended December 31 1958, had net income of $3,864,241, equal to $13.92 per common share, as compared with $4,420,954 or $16.07 per common share the year before. Trading profit amounted to $8,607,064, against $10,343,051. Income from investments amounted to $87,590, against $54,853, and profit on disposal of properties in 1958 amounted to $443,896. Current assets are higher at $33,738,884, against $32,259,644, and current liabilities $4,210,477, against $4,840,702.

The annual report states that replacement sales were well maintained but lower selling prices in a highly competitive market had an adverse effect on profits. Sales to the automotive industry, however, were lower than in previous years due to the recession which carried forward well into 1958. Capital expenditure during the year for expansion, improvements and replacement of property totalled $3,132,023.

President Berkinshaw says in his report that company forecasts an improvement in the automotive sales since public acceptance of 1959 models, introduced during the last quarter of 1958, was most gratifying, and it is estimated that new car sales for the current year will be substantially higher than those of 1958.

During the year, Goodyear introduced three new tyres with successful results. In the spring Goodyear offered a new De Luxe Super Cushion Nylon tyre, and as a result of its acceptance there was a marked increase in the percentage of nylon tyre and in passenger car use. For the trucking industry the company introduced a new traction tyre, the Hi-Miler Cross-Rib.

Mr Berkinshaw states that the directors are confident that the gradual improvement in business activity evident in the latter part of 1958 will continue throughout the coming year. This improvement is expected to lead to a modest expansion in the market for industrial rubber products and a substantial increase in the market for tyres.

Mr Alan H. Marshall has been elected a director of the Teluk Piah Rubber Estate (1914), the Rosevale Rubber Co., the Pilmoor Rubber Co., the Bukit Cloh Rubber Co. and the Bahru Selangor Rubber Co. Mr H. R. Quartley has resigned from the boards of these companies and as a director of the Ulu Yam Rubber Co.

With acknowledgements to F. C. Huyck & Sons, Rensselaer, N.Y.

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Rubber Statistics

MALAYA — GERMANY — JAPAN — SWITZERLAND

DETAILS of Malaya's ocean shipments and imports during February have now been received from Malaya House. The following tables, which are expressed in long tons, summarize the information issued:

Ocean shipments to:	Sheet and crepe	Latex
UK	8,482	2,502
US	10,198	2,259
Canada	2,479	65
India	1,598	—
Australia	2,151	433
Czechoslovakia	1,640	—
France	4,339	391
Western Germany	4,027	1,165
Italy	2,847	425
Netherlands	881	256
Poland	2,460	—
Spain	1,589	127
Sweden	1,580	84
USSR	22,342	—
Argentina	2,277	153
Brazil	1,787	12
Japan	6,484	1,023
Others	6,830	510
	83,991	9,405

Imports from:	Total
Indonesia—Sumatra	14,242
Borneo	5,133
Remainder	2,408
British Borneo	3,046
Thailand	4,833
Others	192
	29,854

Compared with January, the total for ocean shipments was some 5,000 tons lower, and shipments of latex accounted for nearly 2,000 tons of this decline. Shipments to the UK fell by some 5,500 tons, and those to the US fell by about 5,000 tons. In the case of several other countries, the January shipment total was not reached, in particular in the case of Japan, where the amount was some 7,500 tons as against 11,500 tons. But Russia took the very large quantity of 22,342 tons, compared with the January figure of only 4,265 tons, and thus raised the month's total for all destinations to near the January level.

Imports during February fell some 1,700 tons short of the January figure, in spite of a considerable increase in imports from Thailand, from 1,636 tons in January to 4,833 tons. Imports from Sumatra fell from 16,880 tons to 14,242 tons.

Stocks of rubber held in Singapore at the end of January were particularly low, having normally amounted to between 53,000 tons and 58,000 tons during 1958 and having fallen during the period since October 31 to the low level of 37,866 tons by January 31. Of this quantity, 29,136 tons (compared with a normal figure of 48/50,000 tons) were held by dealers, 8,684 tons were held in the port and 46 tons were on estates, while in addition there were a further 2,484 tons in the process of foreign transhipment.

Germany

The latest information issued by the Secretariat of the International Rubber Study Group includes details of the West German rubber position up to the end of November.

During the first eleven months of the year imports of natural rubber into Western Germany totalled 109,217 tons of crude rubber and 11,558 tons of latex, the gross imports, at 120,775 tons, falling some 6,000 tons below the corresponding figure for the first eleven months of 1957. Imports from Malaya, at 60,298 tons, were about the same as during the previous year, but imports from Indonesia only amounted to £28,590 tons as compared with the 44,222 tons imported during the earlier period. Other countries from which rubber was imported included Ceylon (11,072 tons), Thailand (7,548 tons), Nigeria (5,118 tons), the Belgian Congo (2,141 tons), British North Borneo (1,028 tons), and Vietnam and Cambodia (1,677 tons).

Consumption of natural rubber during this period amounted to 114,071 tons of crude and 11,120 tons of latex, making 125,191 tons in all, an increase of about 4,000 tons compared with the corresponding 1957 figure. Stocks of natural rubber, which at the beginning of the year had amounted to 15,154 tons of crude and 657 tons of latex, stood at 12,181 tons of crude and 568 tons of latex on November 30.

Synthetic rubber production during these months totalled 19,962 tons, almost doubling the 1957 figure of 10,954 tons. In addition, 30,418 tons were imported from the US and 5,435 tons from Canada, together with 796 tons from other sources, to give a total figure of 36,649 tons, or a little over 1,000 tons more than in the previous year. Consumption of synthetic amounted to 47,332 tons as against 43,292 tons in the earlier period, and stocks on hand, which had amounted to 6,864 tons at the beginning of the year, had fallen to 5,846 tons by the end of November.

Production of reclaim totalled 35,268 tons, an increase of 2,000 tons over the previous year's figure, and consumption was similarly increased at 33,107 tons. Stocks of reclaim on hand at the end of November had risen from the January 1 figure of 4,182 tons to 4,504 tons.

Japan

The Japanese Rubber Importers' Association, reporting from Tokio, states that imports of crude rubber during January amounted to 10,490 tons compared with the December imports of 11,688 tons. Of the January total, 8,306 tons were received from Malaya and 224 tons from Indonesia.

Imports of latex totalled 775 tons as against imports of 1,246 tons in the previous month, Malaya providing 658 tons to Indonesia's 117 tons. Imports of synthetic latex totalled 257 tons, an increase of 11 tons over the previous month's total, the US supplying 233 tons and the UK 22 tons. Imports of styrene butadiene, excluding latex, amounted to 1,271 tons compared with December's imports of 1,092 tons, the US supplying 970 tons and Canada 285 tons. Waste rubber imports were three tons above the December figure with 605 tons, of which 415 tons came from the US and 137 tons from the UK.

Crude rubber consumption during January is estimated to have reached 10,300 tons, the December figure having been rather more than 1,000 tons greater at 11,340 tons. Production of rubber articles from crude, synthetic and latex in January amounted to 10,438 tons as against a revised total for December of 11,385 tons, automobile tyres and tubes accounting for 3,597 tons of this total compared with 3,836 tons in the previous month.

Switzerland

Swiss rubber imports during February, including waste rubber, amounted to 562 tons, representing a sharp fall compared with the previous month's imports of 1,170 tons, though the total for February 1958 was also comparatively low at 635 tons. Malaya supplied 316 tons of the February imports, and other countries sending this rubber included Western Germany, the US, Indonesia, Canada and Ceylon.

Imports of rubber in the form of sheets, strips, balls, etc., without fabrics or metal parts attached, totalled 86 tons as against 110 tons imported during the previous month and 123 tons imported in February 1958. The February imports included 39 tons from Western Germany, while Belgium, France, the UK, Italy and the US also sent smaller quantities.

Catalyst for Polyether Urethane Foams

The Chemicals Department, Union Carbide International Co., Division of Union Carbide Corporation, has recently made available a new catalyst for the manufacture of polyether urethane foams. This new catalyst, designated Niax Catalyst D-22, is a special grade of dibutyl tin dilaurate suitable for the intended application, which is covered by pending patent applications. Niax Catalyst D-22 is, the makers state, many times more active than fast amine catalysts now commonly used by the industry.

Mr C. C. Stephen has resigned his directorship with Lunuva (Ceylon) Tea and Rubber Estates from the end of this month.

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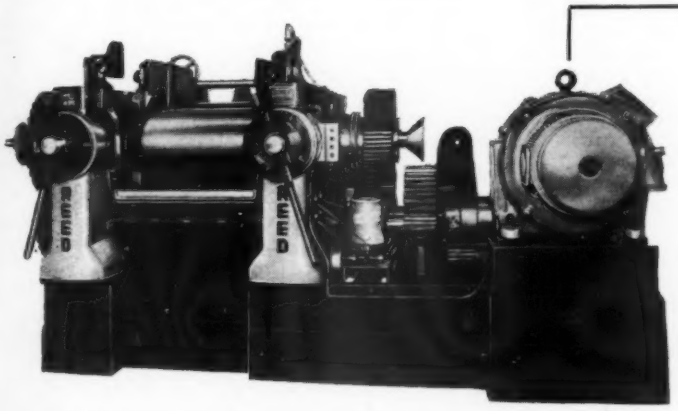

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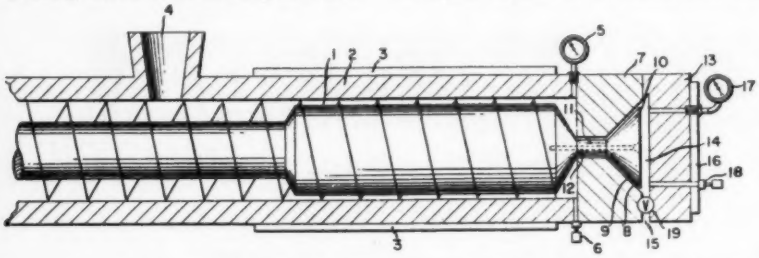
PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 3s. 6d. per copy (including postage).

Extruder-Mulling Device

No. 804,821 E. I. du Pont de Nemours and Co. Application and Filed, August 16 1956. Application in USA, October 6 1955. Published, November 26 1958.

The invention relates to an extruder-mulling device for extruding and compounding plastic materials. As shown in the drawing, the device comprises an extruder screw 1 rotating without conventional thrust bearings in an extruder barrel 2 equipped with heaters 3 and an entry 4 for plastic material. A pressure gauge 5 and a thermocouple 6 for temperature measurements on the material being processed are installed near the nose of the extrusion screw. The screw 1 preferably regulates the amount of plastic material fed to the extruder and preferably has an unusually shallow flight to generate very high pressures. The length of the screw and the magnitude of the helix angle should be such as to produce melting of the plastic material within the channel (in cases where the material is fed as a solid).



The material passing forward from the screw must pass between a mulling head housing 7 having a conical internal surface 8 and a correspondingly shaped surface 9 of a detachable nose-piece 10 which turns with the extruder screw. The housing 7 and the nose-piece 10 may have a shaft portion 11 immediately rearward of the conical surfaces in which a shaft 12 rotates with the screw and communicates the motion of the screw to the conical portion of the nose-piece. The rearward thrust on the extruder screw which is generated by the action of the screw on the plastic material in the barrel 2 is absorbed in the mulling head and in particular is applied to the material as it is forced between the conical surfaces 8 and 9. The plastic material becomes smeared into a very thin layer between these conical surfaces where it is submitted to a mulling action. The mulling head housing includes a die member 13 which encloses a zone 14 occupied by the mulled material prior to release through the outlet 15 of the die. The die member 13 may be equipped with a heater 16, pressure gauge 17, thermocouple 18 and die valve 19 to regulate the back pressure and thrust exerted against the mulling surfaces.

Pastes, liquids and thermoplastic materials can be handled in the machine, a specific application being the preparation of colour concentrates in nylon resins. It is useful for the preparation of pigment dispersions in inks and for mixing colours with thermoplastic materials generally.

Shorter Abstracts

Bonding Rubber to Metal. 806,449. Lord Manufacturing Co. Filed, April 24 1956. — Brominated polymerized 2,3-dichlorobutadiene-1,3 is used as an adhesive for bonding natural and synthetic rubbers to metal. The adhesive is applied to the metal surface, a layer of unvulcanized rubber stock is applied to the adhesive-coated metal and then the rubber is vulcanized by heating the assembly under pressure.

Bonding Rubber to Non-metals. 806,450. Lord Manufacturing Co. Filed, April 24 1956.—An adhesive for bonding olefinic rubbers to non-metals comprises a mixture of an isocyanate and polymerized 2,3-dichlorobutadiene-1,3, or an after-halogenated derivative of this polymer. The adhesive is particularly suitable for bonding olefinic rubbers to polyurethane rubber, the rubbers being vulcanized under heat and pressure after assembling with an intermediate layer of adhesive.

ADHESION CONFERENCE

The London Sections of The Institution of the Rubber Industry and the Plastics Institute have arranged a one-day Conference on 'Adhesion,' to be held on Friday April 17 1959, in the William Beveridge Hall of the University of London, Senate House, Malet Street, W.C.1. Admittance will be by ticket only.

The programme will be as follows: 10.15, 'Physical Aspects of adhesion,' by N. A. De Bruyné, M.A., F.Inst.P., F.R.Ae.S.; 11.15, 'Surface Chemistry of Adhesion,' by W. C. Wake, Ph.D., F.I.R.I.; 12.00, 'Synthetic Melt Adhesives and their Applications,' by L. E. Puddefoot, B.Sc.

2.15, 'The Assessment of Bond Quality in Glued Wood Joints,' by R. A. G. Knight, B.Sc. (Eng.), M.I.Mech.E.; 3.0, 'The Relation of Physical Testing to the Uses of Pressure Sensitive Adhesives,' by J. F. Millard, M.A., A.R.I.C.; 3.45, Survey of Conference by Professor D. D. Eley, Sc.D., Ph.D.

Canadian Rubber

Consumption of rubber (natural, synthetic and reclaim) in Canada advanced 25% in January this year to 20,444,000lb. (last year 16,366,000). Consumption of natural rose to 7,484,000lb. (6,026,000), synthetic to 9,842,000lb. (7,866,000) and reclaim to 3,118,000lb. (2,474,000). Natural rubber consumed in the month accounted for 36.6% of the total (36.8%), reclaim for 15.3% (15.1%) and synthetic was unchanged at 48.1%.

Total rubber consumed in the manufacture of tires and tubes increased in January to 14,073,000lb. (10,587,000), in footwear to 1,755,000lb. (1,622,000) and in all other products to 4,029,000lb. (3,550,000). Rubber used in the output of wire and cable fell to 587,000lb. (607,000). Production in January was 12,983 tons of synthetic and 506 tons of reclaimed.

Rubber Crop Returns

THOMAS BARLOW AND BRO.

	Feb. 1959 lb.	Fin. year to date lb.
The Bradwall	91,000	233,500 (284,000)
Chersonese	42,000	107,000 (96,000)
Highlands Malaya Plantations	400,000	926,600 (866,150)
Klabang	77,000	177,000 (158,500)
Krian	1,700	13,500 (18,840)
Muar River	108,000	245,000 (283,000)
Sungei Krian	127,000	296,000 (336,500)
Manchester North Borneo	57,195	740,989 (659,642)*

* Eleven months. All the rest two

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Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

THE conditions in the London stock markets in the past two weeks or so have been buoyant. The main spur to the buying has, of course, been the Budget and its inherent prospects. Although there was some evidence of profit-taking before the contents of the Despatch Box were made public property, prices on balance still showed considerable gains.

For the most part the buying was concentrated on the shares likely to benefit directly from Budgetary moves. Electricals, stores and the shares of the various domestic equipment makers all responded. Shares of the plastics and rubber manufacturing concerns were for once left out of the rise, but bearing in mind the moves contained within the Budget one is forced to wonder how long they can be passed by.

The main reason for this apparent neglect was, of course, the trading setback disclosed by the IMPERIAL CHEMICAL giant. Whether the market is right in associating chemicals and plastics as though they were inseparables, still remains to be proved correct.

The market had certainly anticipated a further decrease in the financial results of this great company but the falling off in profit margins as evidenced by the full figures was certainly well in excess of expectations.

Imperial Chemical ordinary shares were marked back sharply and, because of the gearing between them and the convertible loan stock, it too suffered a set-back.

Sales turnover of I.C.I., however, was virtually unchanged at £463 million but the group income before tax and after increased depreciation fell from £55 million to £44,500,000. Taxation took £20,600,000 compared with £28,800,000 which left the net figure some £5 million lower at £23,800,000.

The dividend level is maintained at 8% with the payment of a final of 5½%. After the initial impact of the news had worn off and the City found time to get busy penetrating into the real meaning of the results with their slide rules, the general opinion was that they were not really so bad as they at first appeared and that the main factor in favour was the holding of the level of sales.

Although the effect of the I.C.I. news was generally depressing, it made very little impression on the shares of other chemical concerns which have become closely aligned to I.C.I. stock market-wise. LAPORTE INDUSTRIES ordinary shares showed a gain of just over 1s. to a new high of 1958/59 of 22s. 10½d. This rise can be entirely accounted for by the recommendation of these shares as a very worthwhile long-term investment by a leading commentator in the national Press.

ALBRIGHT AND WILSON ordinary were another fairly strong spot following the news of a second interim (to all intents and purposes this is a final dividend) of 13%. This payment

Continued on page 565

Share Price Movements

Par Value	Company	1958-59 High	Low	Mar. 28	Latest
5/-	Albright & W. Ord. ..	22/6	13/4½	22/-	22/6*
£1	„ „ „ 5% Pref...	16/7½	15/4½	16/3	16/3
5/-	Anchor Chemical Ord...	12/7½	10/3	12/3*	12/6
5/-	Andersons Rub. Ord. ..	4/3¾	3/-	3/0¾	3/1½
2/-	Anglo-Amer. Vulc. Fibre Ord.	4/3	2/-	3/3	3/4½
£1	Angus Geo. Ord. ..	29/10½	21/-	29/3	29/-
5/-	Armitage (Sir Elk.) Ord.	4/10½	2/3	4/6	4/6
5/-	Ault & Wiborg Ord. ..	12/10½	11/9	12/3	13/6
£1	Avon India Rubber Ord.	42/-	27/-	36/9	36/10½
£1	„ „ „ 6% Pref.	18/6	17/3	17/6	17/6
10/-	Bakelite Ord.	27/6	17/-	25/9	25/6
£1	„ 6% Pref. ..	19/6	18/3	18/3	18/3
£1	Baker Perkins Ord. ..	47/-	30/7½	45/9	43/6
4/-	Bank Bdg. Rubber Ord.	2/7½	1/6	2/-	2/-
5/-	Boake (A.) Roberts Ord.	18/6	9/-	13/1½	13/-
£1	„ „ „ 5% Pref.	15/1½	13/9	13/9	13/9
4/-	Brammer H. Ord. ..	17/-	9/-	15/4½	16/6
5/-	Bridge, David Ord. ..	27/9	16/3	27/1½	27/6
5/-	Bright, John Ord. ..	13/10½	8/9	11/1½	10/9
2/-	Brit. Ind. Plas. Ord. ..	8/1½	4/9	8/-	7/7½
2/-	„ 10% (tax free) Pref.	5/9	4/8½	4/9	4/9
£1	British Xylonite Ord. ..	57/9	28/6	57/6	55/-
£1	„ „ 5% Pref.	15/6	14/-	14/9	15/7½
5/-	BTR Ind. Ord.	13/3	9/4½	10/4½*	10/6
£1	„ „ 7½% Pref. ..	22/6	20/9	22/6	22/6
£1	Courtaulds Ord... ..	35/10½	20/-	34/1½	33/-
£1	„ 5% 1st Pref.	18/6¾	15/7½	16/9	16/9
£1	„ 6% 2nd Pref.	19/6	17/1½	19/6	19/6
4/-	Cow, P. B. Ord. ..	6/7½	3/6	6/3	6/-
£1	„ 5% Pref. ..	13/6	10/9	13/3	13/3
5/-	Dale, John Ord... ..	15/-	10/-	10/9	11/-
£1	„ „ 6% Pref. ..	15/10½	13/-	15/7½	16/-
1/-	Dannimac Mfg. Ord. ..	6/2½	2/6	5/9¾	5/7½
10/-	De La Rue Ord. ..	33/3	20/9	32/4½	34/9
£1	„ „ „ 3½% Pref. ..	11/9	10/-	10/4½	10/3
6/8	Distillers Co. Ord. ..	27/-	15/9	25/9	25/6
£1	„ „ 6% Pref...	21/0¾	19/10½	21/-	21/-
£100	„ 5% Conv. Loan	£96½	£91	£93½	£93½
£100	„ 5½% Unsec. Loan	£93½	£87 7/16	£93	£93
10/-	Dunlop Rubber Ord. ..	26/7½	14/9	25/1½	25/6
£1	„ 5½% Pref.	18/9	15/10	17/3	17/6*
£100	„ 3½% 1st Debs.	£75	£67¾	£72¾	£75
£100	„ 4½% 2nd Debs.	£82¾	£78	£82½	£82½
4/-	Ebonite Cont. Ord. ..	15/3	7/6	14/-	14/3
£1	English China Clays Ord.	60/-	29/9	57/6	60/-

Par Value	Company	1958-59 High	Low	Mar. 28	Latest
£1	Goodyear Tyre 4% Pref.	12/9	12/-	12/6	12/6
5/-	Greeff Chem. Ord. ..	17/9	14/-	17/-	17/-
10/-	„ „ 5½% Pref...	8/-	7/9	8/-	8/-
4/-	Greengate & Irwell Ord.	7/0¾	4/9	5/9	5/9
£1	Harrisons & Crosfield Dd.	61/3	43/9	54/-	56/3
1/-	Hunt & Moscrop Ord. ..	1/5	1/1½	1/3¾	1/3
£1	Imp. Chem Ord. ..	38/-	28/3	35/9	34/6*
£1	„ „ 5% Pref. ..	17/3	16/-	16/6	16/6
£100	„ 4½% Unsec. Loan	£88¼	£80	£88	£88
£100	„ 5½% Conv. Loan	£121	£99	£118	£115
1/-	Kleemann (O. & M.) Ord.	5/5½	2/6	4/10½	5/1½
£1	„ „ 6½% Pref.	16/9	15/-	16/6	16/6
2/-	Lacrinoid Prod. Ord. ..	2/5½	1/5¾	2/1½	2/-
5/-	Laporte Ind. Ord. ..	22/10½	13/7½	21/9	22/10½
£1	„ „ 7½% Pref.	22/10½	21/10½	22/9	22/9
£1	Leyland & Birm. Rubber Ord.	—	—	52/6*	52/9
£1	„ „ 6% Pref.	21/3	16/1½	16/10½	16/10½
2/-	London Rubber ..	14/4½	8/6¾	14/-	14/-
£1	„ 6% Red. Cum. Pref.	19/9	16/3	18/9	18/9
£1	McKechnie Bros. Ord.	45/-	32/6	43/-	45/-
£1	„ „ 'A' Ord.	44/6	30/-	41/6	40/-
£1	„ „ 6% Cum. Pref.	16/3	16/-	16/3	16/3
5/-	Monsanto Chem. Ord. ..	16/4½	13/-	15/4½	15/9
£1	„ „ 3¾% Pref.	12/6	11/-	12/-	12/6
£100	„ 6% Debs.	£104	£101½	£103	£104
£1	North British Rubber ..	—	—	15/3	15/3
5/-	Redfern Holdings Ord. ..	—	—	2/9	3/1½
2/-	RFD Ltd. Ord.	6/6	3/5½	5/-	6/3
£1	„ „ 5½% Pref. ..	14/9	11/6	12/6	14/9
2/-	Rubber Imp. Ord. ..	15/6	6/-	8/9	7/9
2/-	„ „ 'A' Ord.	14/3	6/-	8/6	7/6
£1	„ 5% 1st Pref.	12/3	10/-	10/6	10/-
5/-	Rubber Reg. Ord. ..	13/-	11/-	10/1½	10/6
4/-	Shaw Francis Ord. ..	18/-	9/9	16/6	16/3
2/-	Silentbloc Ord. ..	8/6¾	7/6	8/-	7/9
2/-	Sussex Rubber Ord. ..	1/8	7½	1/4½	1/4½
5/-	Sutcliffe Speak Ord. ..	7/4½	5/-	7/-	6/9
£1	Turner & Newall Ord. ..	76/4½	52/-	70/7½	71/6
£1	„ „ 7% Pref.	24/-	22/1½	23/3	23/3
5/-	Universal Asbestos Ord.	21/-	8/0¾	19/-	20/6
5/-	Viscose Dev. Ord. ..	10/7½	6/3	9/4½	10/-
5/-	Warne William (Holdgs.) (Ord.)	12/9¾	8/-	12/9	12/6

*Ex-dividend

Rubber Markets

LONDON

Although quiet conditions have prevailed in the London rubber market during the past week, the recent rise in prices has been maintained and fresh gains are recorded. The Spot is only slightly better at 27⅛d. per lb., but forward positions are around ⅜d. higher. The market was sustained by a small Continental demand and reported South American enquiry. There were no reports of Russian buying but Czechoslovakia was believed to be a buyer at one time.

Latest prices are as follows:
No. 1 RSS Spot: 27d.-27⅛d.
Settlement House:
May 27⅛d.-27⅜d.
June 27⅛d.-27⅛d.
July/September 27⅜d.-27½d.
October/December 27⅜d.-27⅝d.
January/March 27⅜d.-27⅝d.
No. 1 RSS cif basis ports:
May 27d.-27⅛d.
June 27d.-27⅛d.
Godown:
April 91⅜ Straits cents nominal.

Latex

Centrifuged latex per gallon in drums, April/May shipment, 16s. seller, cif European ports. Spot, seller, 16s. 4d. Bulk, seller, 15s. 11d. Creamed, seller, 15s. 6d. Normal, seller, 12s. 1d.

SINGAPORE

After opening around previous final levels on April 6, the market steadied on fair buying interest and reserve of sellers, but conditions generally were quiet with volume rather small. The afternoon was very quiet with little inclination to trade by either side. Exchanges were small and price changes limited. Factories were small buyers.

	Straits cents per lb., fob Malayan ports to open ports	
	Close	Previous Close
No. 1 RSS, April	91⅛—91⅜	91⅛—91⅜
May	92 —92⅛	92 —92⅛
No. 2 RSS, April	90⅝—91⅛	90⅝—91⅛
No. 3 RSS, April	90¼—90⅝	89⅜—90¼
No. 4 RSS, April	88⅜—89⅛	88⅜—89¼
No. 5 RSS, April	87⅜—88⅛	87 —88
No. 1 RSS, Spot	91¼—91⅜	91¼—91⅜n
No. 3 blanket, thick remilled, April	85½—87½	85 —87
No. 1 fine pale crepe, April	95½—96½	94½—95½
2X thin brown crepe, April	87 —88	86¾—87¾

Tendency: Very quiet

The Industrial Syndicate quote latex, native produce, 60% centrifugal, packed in rec. drums fob at 180.60d. per gallon.

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on April 6 was 115/116 (116) Ceylon cents per lb.

NEW YORK

The New York rubber market ruled as under on April 6:

Dealers' Prices

	US cents/lb., ex-dock	
	April 6	Previous
No. 1 RSS, April	32½b–32¾a	32½b–32¾a
May	32½b–32¾a	32½b–32¾a
No. 2 RSS, April	32b –32¼a	32b –32¼a
May	32b –32¼a	32b –32¼a
No. 3 RSS, April	31½b–31¾a	31½b–31¾a
May	31½b–31¾a	31½b–31¾a
No. 1 RSS, Spot	32½b–32¾a	32½b–32¾a
No. 3 amber blanket crepe, June	30¾b–31a	30¾b–31a
No. 1 latex, thin crepe, April	32¼n	32¼n
No. 1 latex, thick crepe, April	32¼n	32¼n

Futures—Rex Contract

	Close	Prev. Close
May	32.60b–32.75a	32.55b–32.75a
July	32.38t	32.35b–32.40a
Sept.	32.35t	32.30b–32.38a
Nov.	32.25b–32.35a	32.25b–32.35a
Jan.	32.10b–32.20a	32.20b–32.30a
March	32.10b–32.15a	32.15b–32.25a
May	32.05b–32.15a	32.10b–32.25a

Sales: 21. Tendency: Quiet, steady

Rubber futures were steady in quiet dealings on April 6. Traders said there was little going on in the physical market, with factories disinterested. Shipment offerings were also light. Trade sources said the quietness stemmed partly from the reluctance of a number of traders to take any position in view of the uncertain trend of US Rubber-United Rubbers' Workers' contract negotiations.

Crepe Rubber

The following prices ruled in New York on March 25:

Dealers' selling prices:	Cents per lb.
Sole crepe, standard grade 'A'	46 (46)
Thick crepe	34 (33¼)

AMSTERDAM

The Amsterdam rubber market ruled as under on April 6:

	Guilders per kilo	
No. 1 RMA	April 6	Previous
April	2.60	2.60
May	2.60	2.60
June	2.61	2.60
April/June	2.60½	2.60
July	2.62½	2.61
August	2.62½	2.61
September	2.62½	2.61
July/September	2.63½	2.62
October	2.63½	2.62

Sales: 15. Tendency: Quiet

DJAKARTA

Prices eased on lack of buying support on April 6. The market closed easier. Export certificates were quoted at 332.

	Rupiahs per kilo	
	April 6	Previous
Spot No. 1 Priok	24.15b	24.25b
Spot No. 2 Priok	23.40b	23.50b
Spot No. 3 Priok	22.65b	22.75b
No. 1 fine pale crepe	23.60b	23.85b

Tendency: Quiet

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on April 3 was 30.00 US cents per lb.

STOCK MARKET

Continued from page 564

brought the total for the year up to 17% which compares with the equivalent of 16% a year ago. The trading profit shows a rise from £4,754,000 to £5,388,000 and after depreciation and taxation the net figure comes out at £1,723,000 (£1,612,000). Not too much reliance should be placed on the comparative levels of the two net profit figures. In the year just ended the tax charge was probably near to normal, bearing in mind the level of the gross profit, but in the previous year, because of tax allowances which were peculiar to that year alone, the charge for taxation was considerably reduced.

Since the preliminary figures which disclosed a large rise in trading profits the ordinary shares of Bakelite have been very well supported in the stock market as our table of share prices will show. Now the full report has come to hand and if anything this adds to the feeling of well-being.

Current assets have improved by around £300,000 at £4,837,000 while current liabilities have been held in check to the tune of £2,020,000, a fall of nearly £70,000. The net improvement in this balance on a statistical basis is very important investment-wise when it is remembered that it was achieved in a period when trading was on the increase.

The trading position of the Redfern Holdings concern (formerly Redfern's Rubber Works) as reflected in the preliminary statement is by no means as cheerful. The trading profit is down from £53,400 to £16,500, and after taxation of £7,600 against £26,500, the net amount available is £7,400 compared with £25,500. Ordinary shareholders are to receive no payment on account for the twelve months just ended against 2½% a year ago.

Last year the profit position of the company was affected by £8,000 of provisions for losses in Australia and to general reserves of a subsidiary. This year no such allocations have been made.

Stock market optimists were also disappointed by the lower profits of Baker Perkins. Group income is once again below the million mark at £893,000 and the net profit comes out at £393,000, a fall of £6,000. The tax charge, however, is considerably reduced at £485,000 (£634,000). Ordinary shareholders receive 10% for the full year which was the level forecast by the board. Prior to the news the market hopefuls had been going for increased profits and a rise in dividend. The disappointment is fully reflected in the fall in the shares.

Industry INTELLIGENCE

Technical Data

Dixie 45 Black

Dixie 45 is a general purpose furnace black made in Great Britain. It is a low-cost black with easy processing characteristics and it imparts medium reinforcement and high resilience to rubber. A comparison between Dixie 45, Dixie 20 (American-produced SRF) and lamp black in natural rubber and SBR forms the subject of Report No. 139/R/59 issued by the Anchor Chemical Co. Ltd., Manchester 11. The compounds used contained 50 phr of black and were accelerated with Furbac. The test results show that Dixie 45 is the most reinforcing and lamp black the least reinforcing of the three blacks, as judged by tear strength and abrasion resistance. In tensile strength, Dixie 20 is highest while in modulus, Dixie 45 is highest. In spite of its superior reinforcement, Dixie 45 lowers resilience less than lamp black in natural rubber and only marginally more than lamp black in SBR. Dixie 45 is excellent for use in tyre casings and is employed extensively in butyl inner tubes, tyre breakers and undertreads, and in high grade mechanicals.

Pigments for Amine-Cured Epoxy Resin Finishes

Epoxy resins can be reacted with suitable polyamines and polyamides to give hard, flexible and chemically resistant finishes. Polyamines can be added in the form of polyamine/epoxy resin adducts, the use of such adducts having the advantage that they minimize the development of 'bloom' on the surface of the epoxy resin finish. The performance of 31 I.C.I. pigments in a finish of this kind is reported in I.C.I. Technical Information —Dyehouse No. 470. The amine used was diethylene triamine and it was added to the epoxy resin in the form of an adduct. Tests were carried out for fastness of the pigments to the adduct and to diethylene triamine, for resistance to hydrochloric acid, nitric acid and caustic soda, and for fastness to overspray, the test procedure being described in each case.

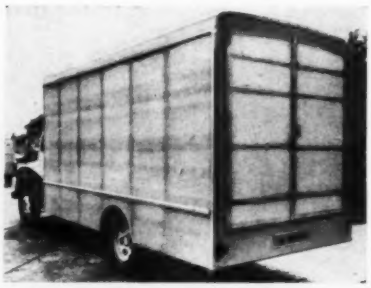
Bisoflex 102 as a Plasticizer for Nitrile Rubber

Bisoflex 102 (triethylene glycol dicaprylate) has been evaluated as a plasticizer for nitrile rubber, the results being reported in Technical Note No. H.208, issued by British Geon Ltd., Devonshire House, Piccadilly, London, W.1. Two types of nitrile rubber were used, namely, Hycar 1001 and Hycar 1042, and Bisoflex 102 was compared with dioctyl sebacate and dibutyl phthalate. The compounds contained 50 phr of HAF black and 10 or 25 phr of plasticizer. Bisoflex 102 gave substantially the same results as dioctyl sebacate, but it has the advantage that it does not exude from Hycar 1001 like dioctyl sebacate. Data are given for the physical properties of the vlucanizates before and after ageing in air, in oil and in rubber test fluid.

Machines, Materials and Equipment

Reinforced Plastics in Vehicles

A new type of commercial van body, made entirely from reinforced Bakelite polyester resin, has been designed and manufactured by Samlesbury Engineering Ltd., Samlesbury, near Blackburn, Lancs. The Samlesbury van body, which requires no metal supporting framework, is constructed from two basic types of prefabricated reinforced resin panels—one for the sides and one for the roofing. Each panel is flanged on all four sides and assembly is effected by securing the flanges of adjacent panels with small nuts and bolts. Moulded-in reinforcing ribs, also made from Bakelite polyester resin, give the panels adequate rigidity and the entire structure is secured to the floor and bearers by light alloy angle. The design enables the prefabricated panels to be readily built-up as required for erection on any size of chassis. Among the many important features of this original design are the good



A commercial van body made entirely from Bakelite polyester resin

weight/strength ratio of the bodywork and the comparative ease with which the operator can carry out minor repairs with resin and glass fibre materials. If damage is more extensive, a complete prefabricated panel can be unbolted and replaced in approximately 30 minutes. The rear doors, also constructed from reinforced resin, are interchangeable and hung on conventional type mild-steel hinges. Impregnated colour panels can be supplied where required instead of the natural colour finish. In addition to their application on vehicle bodywork, the Samlesbury prefabricated roof and body panel sections are suited, the makers state, for the manufacture of containers, portable sheds, garages or other prefabricated buildings.

New 'Dialam' Bushings

A new range of 'Dialam' apparatus bushings have been introduced by Permali Ltd., Bristol Road, Gloucester, to meet North American (NEMA/CEMA) specifications. They are designed as a standard interchangeable oil circuit breaker and transformer bushing and are supplied for all standard ratings from 8.66 to 69 kv, 1,200 amps. In construction, these bushings are of a generally simple and robust design. There is no conservator head and a spring washer assembly reduces the short air length. The insulating core is manufactured from a grade of bakelized paper, giving high thermal stability and low dielectric loss characteristics plus good mechanical strength and resistance to moisture. Thin metallic foils are inserted during the wrapping process to provide conducting layers for controlling both axial and radial stresses.

Publications Received

Leveltron Industrial Proximity Switch

The new Leveltron industrial proximity switch manufactured by Thomas Industrial Automation Ltd., Station Buildings, Altrincham, Cheshire, is described in a leaflet recently issued by the company. The Leveltron operates on the electrical capacitance principle whereby the change in capacitance at an electrode on the approach or recession of a material actuates a control relay. It will operate at up to 60 yards from the point of detection. Some typical applications; it can be used for controlling pumps, conveyors, feed gates, valves, fans, remote indicate units, and for indicating manometer levels etc.

Butyl Rubber Shipwiring Cables

Lloyds Register of Shipping has given approval for the use of Butyl shipwiring cables and shipowners have demonstrated that these cables offer reduced cable cost in view of the higher current rating permissible, reduced installation cost as the cables do not require to be jointed as do varnished cambric insulated cables, and lastly, reduced maintenance as butyl rubber is resistant to deterioration through ageing or corrosion. This is stated in a booklet, 'Butyl Shipwiring Cables,' recently issued by the Esso Petroleum Co. Ltd. This publication is in the form of a status report.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

London Section.—Tuesday April 14 at the Criterion, Piccadilly, London, W.1, at 6.30 p.m. Annual general meeting.

Manchester Section.—Monday April 13 at the Engineers' Club, Manchester. Annual general meeting and social evening.

Merseyside Section.—Monday April 13 at the Exchange Hotel, Liverpool, at 7.15 p.m. Annual general meeting, followed by hot pot supper.

Midland Section.—Monday April 13 at the Goodyear Tyre and Rubber Co., Ltd., Wolverhampton. 'Personnel Management—the Human Factor in Productivity,' by J. Maslin, F.I.P.M., M.B.I.M., Accles and Pollock Ltd.

South Wales and Monmouthshire Section. — Monday April 13 at the Angel Hotel, Cardiff, at 7.30 p.m. Annual general meeting.

PLASTICS INSTITUTE

Midland Section.—Friday April 17 at the James Watt Memorial Institute, Great Charles Street, Birmingham 3, at 6.30 p.m. 'Fire and Heat Resistant Materials,' by W. Wilson, D.Sc., Ph.D., A.R.C.S., F.R.I.C., British Industrial Plastics Ltd.

North-Eastern Section.—Wednesday April 15 in the Second Dining Room of the Eldon Grill, Grey Street, Newcastle, at 7 p.m. Annual general meeting.

Scottish Section.—Wednesday April 15. Visit to the Singer Manufacturing Co. Ltd., Clydebank.

South Wales and Monmouthshire Section.—Wednesday April 22. Works visit to Semtex Ltd., Brynmawr.

Yorkshire Section — Wednesday April 15 at St. Mark's House, 186 Woodhouse Lane, Leeds. Annual general meeting and visit by the president, Dr J. C. Swallow.

EXHIBITIONS

Corrosion Exhibition, Royal Horticultural Hall, London, April 27-30.

Engineering, Marine, Welding and Nuclear Energy Exhibition, Olympia, London, April 16-30.

Factory Equipment Exhibition, Earls Court, London, April 7-17.

Heat and Sound Insulation Exhibition, Earls Court, London, April 7-17.

Chemical Institute of Canada.—Friday May 1 at Sheraton-Brock Hotel, Niagara Falls, Ontario, Rubber Chemistry Subject Division meeting. October 19-21 at the Guild Inn, Toronto, Ontario, 9th Canadian High Polymer Forum, co-sponsored by the National Research Council and the Chemical Institute of Canada.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

VIVALINK (782,193) For driving belts for machines, being goods made wholly or principally of canvas or of rubber. By The Outra Belting and Rubber Co. Ltd., Minerva Road Works, Park Royal, London, N.W.10. To be associated with No. 143,794 (2924, 465) and others. (Class 7; March 11 1959.)
and others. (Class 9; March 11 1959).

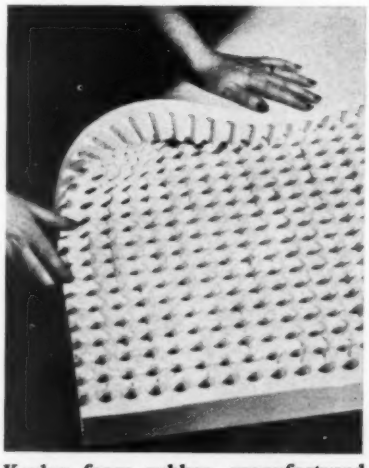
COLODENSE (783,896) For cellulose plastics included in Class 17 in the form of transparent films. By Colodense Ltd., West Street, Bristol 3. To be associated with No. 766,537 (4139, 1183). (Class 17; March 11 1959.)

OUROBOROS (783,274) For gutta percha, india rubber, balata and articles included in Class 17 made from these substances; and synthetic resin plastics included in Class 17 in the form of rods, tubes and shaped sections. By the Phoenix Rubber Co. Ltd., 196 High Street, Bromley, Kent. To be associated with No. 771,096 (4148, 33). (Class 17; March 11 1959.)

SOLUFILM (779,179) For materials in the form of film made of plastics included in Class 17, for use in manufactures. By the Societe des Usines Chimiques Rhone-Poulenc, 21 Rue Jean - Goujon, Paris 8e, France. Address for service is c/o W. Symmons and Co., 329 High Holborn, London, W.C.1. To be associated with No. 779,178 (4209, 270). (Class 17; March 11 1959.)

MAXBOND (B775,769) For monolithic firebricks made of plastics. By Mexico Refractories Co., Love and Cole Streets, Mexico, Missouri, USA. Address for service is c/o George Ham and Co., 93-94, Chancery Lane, London, W.C.2. (Class 19; March 11 1959).

DINETTE (780,047) For upholstery fabrics, being piece goods made of plastics in imitation of textile materials. By Dinette Ltd., 97 and 99 Park Street, London, W.1. (Class 24; March 11 1959).



Koylon foam rubber, manufactured in continuous lengths for the first time, is being made by United States Rubber Co. in 60-in. widths and in both 2-in. and 1-in. thicknesses. Two-in. thickness is made in 8-yd. rolls and 1-in. thickness in 17-yd. rolls

PATENT LIST

Printed copies of the Specifications in the following list can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on April 2 1959

Dunlop Rubber Co. Ltd. Cords. (Addition to 775,093.) 811,297.

Rheinpreussen Aktiengsellschaft Fuer Bergau und Chemie, and K. Wahl. Production of phenolic resins. 811,315.

Ciba Ltd. Method of hardening epoxide resins. 811,310.

National Research Development Corporation. Flexible foamed polyurethane products. 811,296.

BTR Industries Ltd., formerly British Tyre and Rubber Co. Ltd., and M. Arnett. Belting hose and like flexible members. 811,108.

P. E. Hawkinson and Co. Tyre retreading devices. 811,329.

Hercules Powder Co. Vulcanization of synthetic rubbery copolymers of butadiene and styrene. 811,140.

United States Rubber Co. Diolefine polymer rubber vulcanizates. 811,220.

J. Brockhouse and Co. Ltd. Equipment for mounting pneumatic tyres on vehicle wheels. 811,073.

Tan-Sad Chair Co. (1931) Ltd. Reinforced plastic chair pedestals. 811,187.

Chelton (Poppits) Ltd. Plastic beads. (Addition to 750,737.) 811,074.

Dunlop Rubber Co. Ltd. Method of producing rubberized cord reinforcements. 811,320.

E. I. du Pont de Nemours and Co. Drawing of polyamide structures and especially nylon filaments. 811,349.

Badische Anilin- and Soda-Fabrik A.G. Products containing polymerized N-vinyl lactams and polyalkylene imines. 811,135.

S. C. Johnson and Son Inc. Epoxidized polyesters. 811,126.

American Cyanamid Co. Production of acrylonitrile. 811,136.

Dow Chemical Co. Treatment of acrylamide polymers. 811,194.

NEW COMPANIES

James Coates Bros. Ltd. (621,003).—February 13. Capital: £5,000 in £1 shares. To acquire the business of engineers and plastics manufacturers carried on by Mrs A. Ogden and Mrs V. Taylor as 'James Coates Bros.' at 431 Oldham Road, Middleton, Lancs., etc. The permanent directors are: Jack Ogden, 36 Waverley Road, Middleton; Derek N. Taylor, 282 Manchester Road, Sudden, Rochdale; Peter L. Bridge and Harry W. Allen. Regd. office: Brookside Mills, Townley Street, Middleton, Lancs.

B. J. Hamlin Ltd. (621,014).—February 13. Capital: £20,000 in £1 shares. To acquire the business of an importer and exporter carried on by B. J. Hamlin at Greener House, 66/8 Haymarket, London, S.W.1, and to carry on the business of importers and exporters of plastic, modelling and moulding materials and substances, etc. The directors are: Bertram J. Hamlin, and Phyllis D. Hamlin, both of 13 Green Lane, Purley, Surrey; Richard D. Tait, 41 The Avenue, Richmond, Surrey. Regd. office: Greener House, 66/8 Haymarket, London, S.W.1.

PTFE Supplies and Developments Ltd. (621,106).—February 16. Capital: £100 in £1 shares. To exploit the use of polytetrafluoroethylene and synthetic materials of all kinds, and to carry on the business of mechanical, electrical, precision and general engineers, etc. The directors are: Arthur T. Black and Mrs Margery S. Black, both of 58 Petworth Road, Haslemere, Surrey. Regd. office: 58 Petworth Road, Haslemere, Surrey.

Sheridan Plastics Ltd. (621,182)—February 17. Capital: £10,000 in £1 shares. To carry on the business of flooring manufacturers, contractors and specialists, etc. The permanent directors are: Harry L. Sheridan (managing director), and Vera D. Sheridan, both of 65 Littledown Avenue, Bournemouth. Regd. office: 38 Poole Road, Westbourne, Bournemouth.

Haymarket Flooring Co. Ltd. (621,205). — February 17. Capital: £1,000 in £1 shares. To carry on the business of layers of parquet, rubber, stone and other floorings, manufacturers of flooring and caulking materials, rubber and rubber goods, etc. The directors are: Ralph A. C. Dean, 96 Redemarsh, Wardley, Gateshead, 10; Charles A. Dean, 28 Coverdale, Wardley, Gateshead, 10; John C. White, 32 Snowball Terrace, Gateshead, 8. Solicitors: Smirk Thompson and Craigs, Newcastle upon Tyne, 1.

Holite Ltd. (621,380)—February 19. Capital: £5,000 in £1 shares. To carry on the business of manufacturers of plastic printing materials, plastic stereotypers, etc. The directors are: Mrs Edith M. Hole (life governing director), 17 Canonbury Square, London, N.1; Albert Stevens, 55 Hunter Road, Ilford; Miss Beatrice M. Matthews and Dorothy M. Kempton. Regd. office: 8 Breams Buildings, London, E.C.4.

Latest Wills

Mr Lucien Gaisman, of 11 Rue Marignac, Geneva, Switzerland, founder and former chairman and managing director of Shockstop Rubber Products Ltd., Audenshaw, near Manchester, who died on July 20 last, left estate in England valued at £15,581 16s. 11d. gross, £15,550 1s. 9d. net value.

Mr Reginald Noel Whitehouse, of 3 Myrtle Grove, Coalway Road, Wolverhampton, lately working for Bobbington Mills, previously for over 20 years with the Staffordshire Motor Tyre Co., Chapel-ash, who died on December 9, aged 58, left £2,893 13s. 2d. gross, £2,848 16s. 2d. net value.

Mr Henry Herbert Fullwood, of 51 Lichfield Street, Walsall, managing director of Modern Tyre Service (Walsall) Ltd., who died on April 28 1958 left £22,752 3s. 4d. gross, £22,604 7s. 10d. net value. (Duty paid £3,441.)

Changes of Name

Curtis-Woloch Co. Ltd. (520,962), rubber dealers, etc., 58 Bow Road, London, E.3. — Name changed to Neville Curtis and Co. Ltd.

Rubber Journal and International Plastics CLASSIFIED ADVERTISEMENTS

ARTICLES FOR SALE (SECONDHAND)

6d. a word, Minimum 12/6 Box 2/-

EXTRUSION cylinder, 175 mm (7in.), for rubber, with screw and bearings but without drive and motor. Almost new. Attractive price.—Reply to "Gumaelius," Postfack 12 79, Jonkoping, Sweden. (367)

ONE Locker-Constant-Waytrol type 118 A.C., comprising weigh belt with motor (400V/3/50), vibrating feeder type 2A (8in. x 16in. feeder tray) and control cabinet. This machine is unused. Offers or applications to inspect to:—Technical Buying Department, Michelin Tyre Co. Ltd., Stoke-on-Trent. (356)

TWO rubber spreading machines, excellent working condition, 60in. Robinson and 72in. Bridge.—Box 360. (360)

60IN x 24in. 4-bowl even friction calender with 90 h.p. variable speed drive. 4½in. Iddon strainer extruder with 30 h.p. drive. 4 Carter high speed braiding machines.—Reed Brothers (Engineering) Ltd., Replant Works, Woolwich Industrial Estate, London, S.E.18. Telephone: Woolwich 7611/6. (363)

MISCELLANEOUS

6d. a word, Minimum 12/6 Box 2/-

FOR sale. Considerable quantities of uncured black tyre compounds, natural and G.R.S., sorted, also regular supplies of 40 mesh black tyre buffings.—Box 373. (373)

MISCELLANEOUS

(continued)

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy, Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

MILLING compounding capacity available. Large or small quantities.—Fleet Rubber Products Ltd, 12-18 Fleet Road, Fleet, Hants. Fleet 1607. (336)

MOULDING capacity available. Competitive prices. Prompt delivery.—Fleet Rubber Products Ltd., 12-18 Fleet Road, Fleet, Hants. Fleet 1607. (335)

SCISSORS ground and set by London cutlers established over 100 years; 48 hours postal service; 1/6 per pair.—J. A. Fowler, 18/22 Bell Street, Edgware Road, London, N.W.1. PAD 1491. (74R)

SLITTING capacity available for tape production.—Phoenix Rubber Co. Ltd., 2k Buckingham Avenue, Trading Estate, Slough, Bucks. Tel. No. 22307. Grams: Phenrub, Slough. (54)

APPOINTMENTS WANTED

6d. a word, Minimum 10/- Box 2/-

CHEMIST/TECHNOLOGIST, wide industrial and with managerial experience, seeks position as assistant works manager, or similar post.—Box 358. (358)